The RUBBER AGE

December, 1946

TECHNOLOGY DEPT. DETROIT

BLACK-OUT

—A new protective coating material
—Applied by brushing, spraying or dipping—

•

Resistant to

SUNLIGHT · OZONE
ACIDS · ALKALIS · OILS

Has Good Gloss—Adheres Well

May be had in—

BLACK · WHITE · CLEAR

•

Booklet and samples available

R. T. VANDERBILT CO., INC.
230 Park Avenue, New York City

LOW HEAT BUILD-UP AND MORE TIRE MILEAGE WITH . . .

ADVANTAGES OF 2-MT OVER THIAZOLES AS SHOWN IN TIRE VULCANIZATES

Rubber stocks accelerated with 2-MT exhibit the following good qualities:

1. **Exceptionally low heat build-up.**
2. **Practically no tendency to revert and exhibit other undesirable effects of long curing.**
3. **Excellent resistance to heat and aging.**
4. **Extraordinary retention of tensile strength, extensibility and resistance to tear, at elevated temperatures.**
5. **Conspicuous resistance to flex cracking.**

Data accumulated from laboratory, plant and road tests prove beyond a doubt that the exceptional quality imparted by 2-MT to natural rubber compounds results in vastly improved truck tire performance. The outstanding advantages of 2-MT are the low heat build-up and the remarkable heat and age resistance that it imparts to stocks without resorting to low sulfur ratios. All of these plus values can be translated into higher mileage and longer life for your tires.

Accelerator 2-MT (thiazoline) shows advantages over MBT (thiazole) similar to those which the thiazoles provided over earlier types of accelerators.

The structural formula of 2-MT shown above reveals some relationship to mercapto benzo thiazole, but in its behavior the following favorable differences will be observed:

1. At vulcanizing temperatures below 267°F. its speed and strength are equal but at higher temperatures it is a slightly stronger and faster accelerator.
2. The modulus curve of stocks accelerated with straight 2-MT is slightly steeper. However, when the 2-MT is activated with a guanidine or an aldehyde amine, the modulus curve is flatter.
3. 2-MT is less acidic than MBT. Consequently it can be activated with guanidines or aldehyde amines with greater safety at processing temperatures.
4. Also because 2-MT is less acidic, the use of Retarder W or other organic acids such as stearic acid has greater retarding effect at processing temperatures. However, at vulcanizing temperatures (above 267°F.) this action is reversed and Retarder W activates acceleration.

Although rubber compounds having the most desirable physical qualities will be obtained by the use of 2-MT without secondary acceleration, activation with a guanidine or with an aldehyde amine such as Accelerator 808 results in faster cures.

Rubber Chemicals Division
E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

DU PONT RUBBER CHEMICALS

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

DU PONT
REG. U.S. PAT. OFF.

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PERMANENT RESILIENCE

Resilient parts made from HYCAR synthetic rubber *stay* resilient. That's partly because of HYCAR's unusual chemical stability—its resistance to oil and gas, acids and most other chemicals. And parts made from HYCAR are extremely resistant to the effects of oxidation, sunlight, and normal aging. A HYCAR sealing ring, for example, will maintain a positive seal through years of service even when constantly exposed to oils and acids inside the pipe, and sunlight and salt air outside.

Other unusual and valuable properties are listed in the box at the right. But most important, these properties may be had in an almost limitless number of combinations, each designed to meet the specific service conditions of the finished part. Parts made from HYCAR have seen service in *every* industry, giving long life, dependability, and economical operation.

That's why we say ask your supplier for parts made from HYCAR. Test them in your own applications, difficult or routine. You'll learn for yourself that it's wise to use HYCAR for long-time, dependable performance. For more information, please write Dept.HD-12B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

CHECK THESE SUPERIOR FEATURES OF HYCAR

1. EXTREME OIL RESISTANCE — insuring dimensional stability of parts.
2. HIGH TEMPERATURE RESISTANCE—up to 250° F. dry heat; up to 300° F. hot oil.
3. ABRASION RESISTANCE—50% greater than natural rubber.
4. MINIMUM COLD FLOW—even at elevated temperatures.
5. LOW TEMPERATURE FLEXIBILITY—down to —65° F.
6. LIGHT WEIGHT—15% to 25% lighter than many other synthetic rubbers.
7. AGE RESISTANCE—exceptionally resistant to checking or cracking from oxidation.
8. HARDNESS RANGE—compounds can be varied from extremely soft to bone hard.
9. NON-ADHERENT TO METAL—compounds will not adhere to metals even after prolonged contact under pressure. (Metal adhesions can be readily obtained when desired.)

Hycar

Reg. U.S. Pat. Off.

LARGEST PRIVATELY PRODUCED BUTADIENE TYPE

American Rubber

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

This advertisement appeared in a long list of carefully selected business papers TO HELP YOU SELL parts made from HYCAR.

LET PHILBLACK A PLAY SANTA CLAUS to your rubber products!

And here are some of the "Christmas presents" Philblack A wants to give you . . .

EASY PROCESSING	SMOOTH, EASY EXTRUSION
HIGH RESILIENCE	PLIANT: SPLICES WELL
LOW HYSTERESIS	HIGHER SHORE HARDNESS
RESISTANCE TO ABRASION	IMPROVED TEAR RESISTANCE
LOWER HEAT GENERATION	SMOOTH CALENDERING

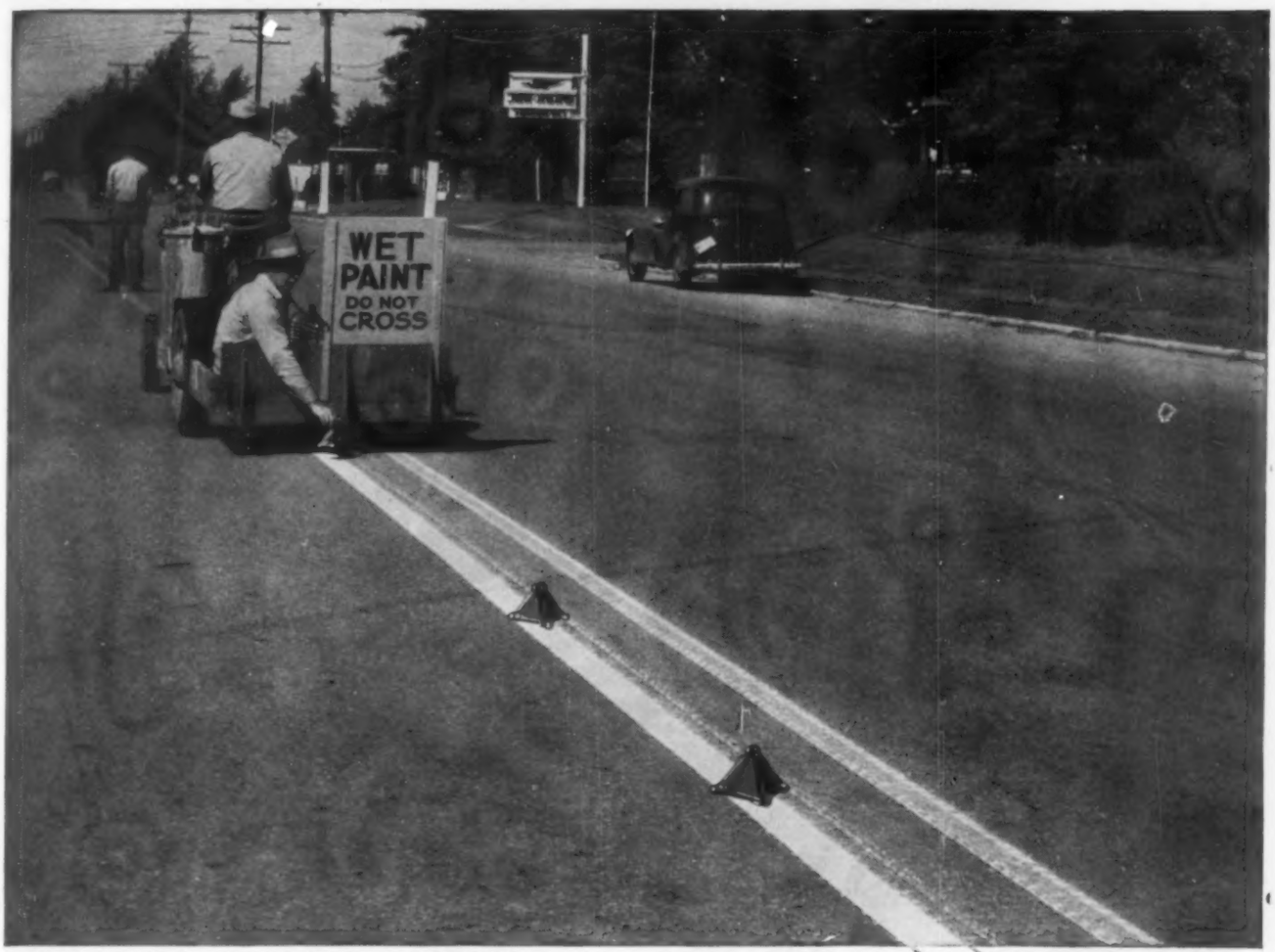
EXCELLENT MOLD FLOW

For an extra happy New Year . . . use Philblack A!

PHILLIPS PETROLEUM COMPANY

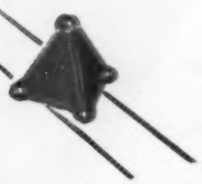
Philblack *Division*

EVANS SAVINGS AND LOAN BUILDING · AKRON 8, OHIO



Traffic paint protectors designed, patented and manufactured by Plastic Engineering, Inc.

Now they're making highway markers from GEON



Another interesting application for GEON raw materials

THOSE highway markers—more properly known as "traffic paint protectors"—are lightweight, easy to handle. They're permanently colored, unaffected by sun, rain, air, heat, cold, paint, oil, or any one of hundreds of normally destructive factors. They're sufficiently resilient that they won't break when dropped from truck to painted line. Nor will they harm a tire if accidentally struck by a car. It was possible to mold them from one of the GEON polyvinyl materials in such a way that they stack easily, yet always land in the right position when dropped from the paint truck.

These properties, plus many others, have made versatile GEON the ideal material for literally hundreds of products in the home and in industry—shower curtains and fly swatters—upholstery and floor tiles—clothing and luggage—wire insulation and acid tank linings.

And GEON can be pressure or injection molded, extruded, calendered or cast into sheet or film. In solution or latex forms it can be applied as coatings for fabrics and fibres of all kinds as well as for paper and cardboard. Products made from GEON may be flexible or rigid, clear or opaque, brilliantly or delicately colored.

For more information about GEON, please write Dept. K-12, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

For technical data please write Dept. RB-12

B. F. Goodrich Chemical Company

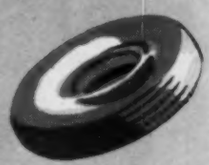
A DIVISION OF
THE B. F. GOODRICH COMPANY

ROSE BUILDING, CLEVELAND 15, OHIO

Reservoir for Industry

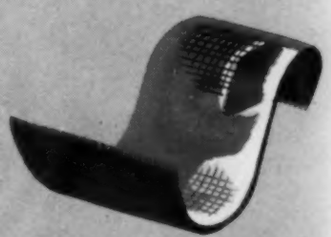
In drum or tank car lots . . . *whether for construction or maintenance, processing or production . . .* the reservoir of Flintkote Industrial Products offers many time-and-money-saving advantages.

Tire cord solutioning is one of the many applications of Flintkote Syntex* aqueous dispersions of rubber.



An outstanding use of Flintkote Hydralt* coatings is the protection of steel against corrosion.

Flintkote fluid rubber compounds are used for rugs and carpet backing and also as saturants, coatings, and bonding cements.



All types of insulation require the kind of protection from the elements that Flintkote insulation coatings provide.

Fibre board for containers is made water-resistant with Flintsize† added during manufacture.

Flintkote sound-deadening materials and industrial adhesives are important components of automobiles and many other consumer durable goods.

*TM Reg. U. S. Pat. Off.
†Trade-mark

A reservoir of supply for your needs. That's another way of describing Flintkote's complete research, development and manufacturing facilities. Let us help you. Write us today.

Flintkote-Products for Industry

THE FLINTKOTE COMPANY · **INDUSTRIAL PRODUCTS DIVISION**

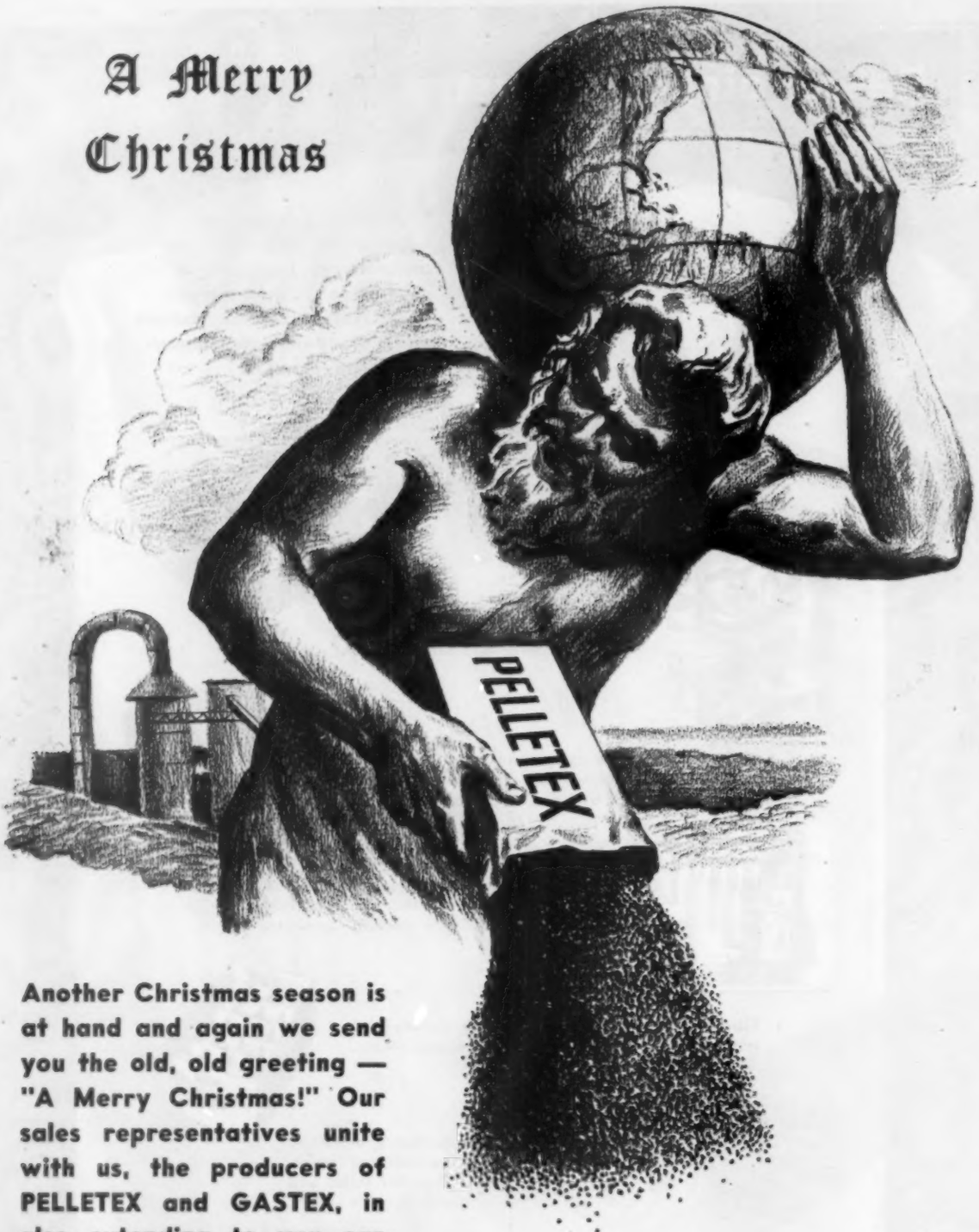
Atlanta · Boston · Chicago Heights · Detroit · Houston

FLINTKOTE INDUSTRIAL PRODUCTS

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Los Angeles · New Orleans · Washington · Toronto · Montreal

A Merry Christmas



Another Christmas season is at hand and again we send you the old, old greeting — "A Merry Christmas!" Our sales representatives unite with us, the producers of PELLETEX and GASTEX, in also extending to you our sincere wishes for a happy, prosperous and peaceful New Year.

MANUFACTURER
GENERAL ATLAS CARBON CO.
PAMPA, TEXAS
GUYMON, OKLA.

DISTRIBUTOR
HERRON BROS. and MEYER
NEW YORK, N. Y.
AKRON, OHIO

We make all types and sizes of rolls . . . to exact specifications . . . for natural or synthetic rubber processing requirements.

The pair illustrated are 28" x 42" cracker rolls—among the largest ever made—for use in the reclamation of giant airplane and tractor tires.

When you need rolls for renewals, or for new processing equipment, it will be to your advantage to specify UNITED ROLLS. Thirty years experience serving the industry, and our unexcelled facilities for precision manufacture, are your assurances of complete satisfaction.

REG. T.M.

UNITED ENGINEERING AND FOUNDRY COMPANY

Pittsburgh, Pennsylvania

Plants at Pittsburgh · Vandergrift · New Castle · Youngstown · Canton

Subsidiary: Adamson United Company, Akron, Ohio

Affiliates: Davy and United Engineering Company, Ltd., Sheffield, England · Dominion Engineering Works, Ltd., Montreal, P. Q. Canada

Batch Stripping Improved by new Taylor Control System

HERE is a new Taylor Coordinated Control System that should facilitate any batch stripping operation.

By automatically regulating pumps and valves where necessary it permits the removal, at a controlled rate, of lower boiling constituents from various liquid combinations. At one of the synthetic rubber plants, where it is being used to recover butadiene and styrene from the special latex batches, efficiency is materially improved and operating attention minimized.

Here is what the new system does. First, a **Taylor Fulscope Time Schedule Controller:**

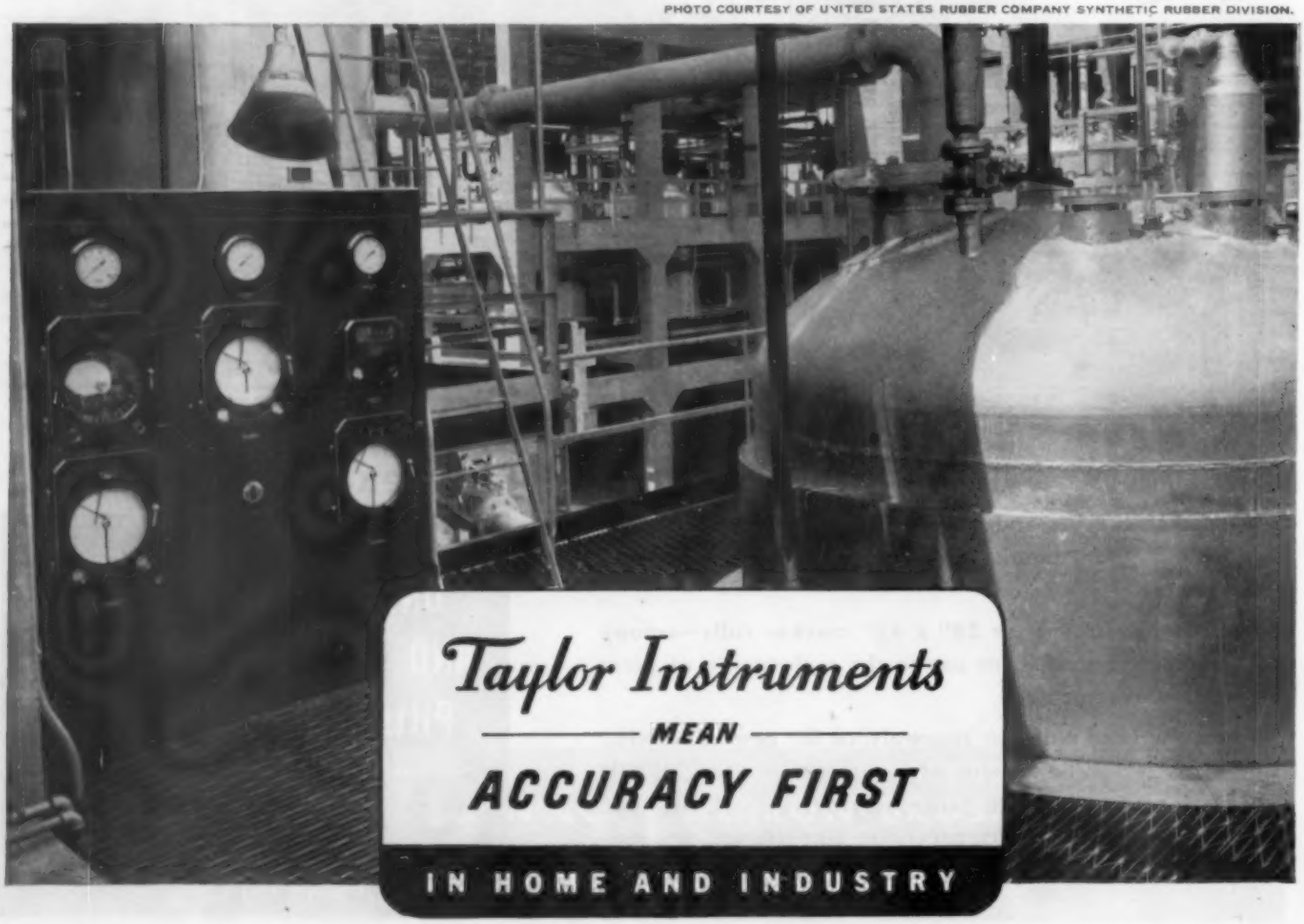
1. Strips butadiene from the unit at a controlled rate.
2. Automatically changes pumps at a given point in the cycle.
3. Removes vapors from the stripping unit until a minimum point is reached.
4. Automatically opens control valve to the styrene recovery unit.
5. Signals operator when steam can be used for heating and driving off styrene.

Then, **manually set Fulscope Controllers** regulate steam flow and pressures to continue the operation.

This is just one of the many Taylor Control Systems we've designed to help you improve quality and increase efficiency. Ask your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

PHOTO COURTESY OF UNITED STATES RUBBER COMPANY SYNTHETIC RUBBER DIVISION.



NOW a superior HIGH SOLIDS latex for general use

CHEMIGUM 101

CHEMIGUM 101 IS BETTER

for **Dipped Goods** because of high solids content, quick-drying and physical characteristics

for **Foamed Rubber** because of high solids content, low viscosity and mechanical stability

for **Adhesives** because of quick-drying, stability and excellent physical characteristics

for **Wire Insulation** because of low water absorption, quick-drying, excellent physical and electrical properties

for **Water-Based Paints** because washability of emulsion-type wall paints is greatly improved by a mixture of CHEMIGUM 101. Penetration reduced, flexibility and toughness improved

HERE is a new butadiene-styrene (45-55 ratio) copolymer latex containing approximately 55% solids. It offers the following important improvements:

1. Quick drying
2. Excellent physical properties — high tensile and elongation with good tear strength
3. Excellent stability, both mechanical and thermal
4. Extremely low water absorption
5. Non-staining

These are qualities that make CHEMIGUM 101 ideal in such diversified applications as wire insulation, dipped goods, foamed rubber and water-based paints. Combined with GRS latices, it is highly useful in improving physical properties and processing characteristics.

CHEMIGUM 101 is available only as an uncompounded latex. For complete information, write: Goodyear, Chemical Products Division, Plastics and Coatings Dept., Akron 16, Ohio.

Chemigum (pronounced Kem-e-gum)—T.M. The Goodyear Tire & Rubber Company

GOODYEAR

THE GREATEST NAME IN RUBBER

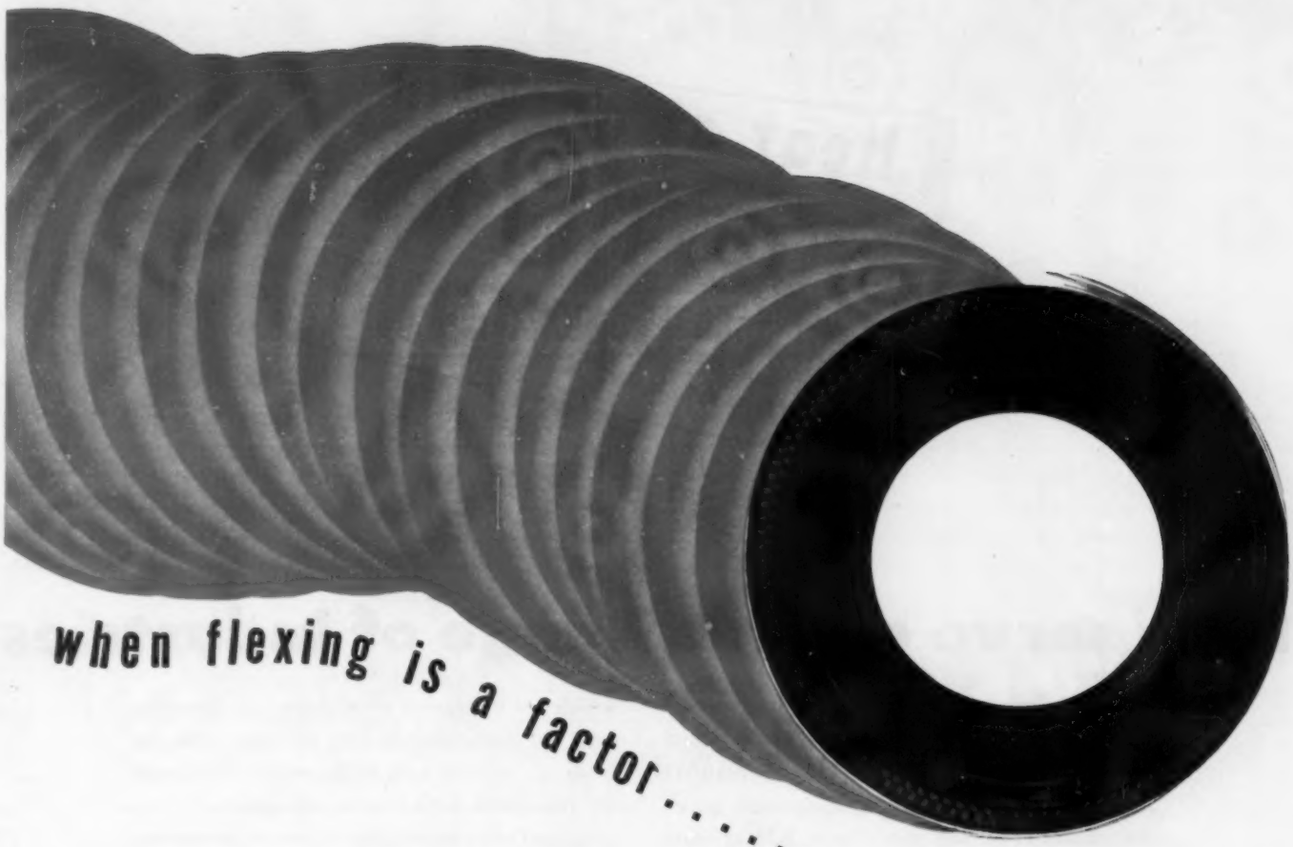
MERRY XMAS FROM HERCO

HERCO-WAX
HERCO-H. T.
HERCO-FLAKE
(Mineral Rubber)
HERCO-PLAS
D.P.G.
CROWN CLAY

CARBON BLACK
PELLETEX
ANTISOL
HERCO-S. O.
(Stabilizing Oil)
HERCO-S. R.
(Stabilizing Resin)
LIQUID LATEX

HERRON BROS. & MEYER

82 BEAVER ST., NEW YORK 5, N. Y.
516 OHIO BUILDING, AKRON, OHIO
SUPPLIERS OF RUBBER CHEMICALS



when flexing is a factor.....

USE MONSANTO LAMPBLACK

99.29% Pure (Typical Free Carbon Analysis)

Any opportunity to cut friction and thereby cut heat "build-up" in rubber is all-important to manufacturers of either the natural or synthetic product.

That's why Monsanto Lampblack No. 10 is being specified by producers today. This formulation of precision-made Monsanto lampblack has demonstrated a *maximum degree of purity and carbon content and virtually complete freedom from empyreumatic matter.* That means less friction and consequently longer rubber life, especially where flexing is encountered. (In an automobile tire, for example, it is estimated that in 20,000 miles 15 million flexings of the tire occur!)

MONSANTO CHEMICALS

SERVING INDUSTRY ... WHICH SERVES MANKIND

Manufacturers likewise favor the good blue-gray undertone this Monsanto Lampblack No. 10 provides.

If you would like to investigate Monsanto Lampblack No. 10 thoroughly, ask for trial samples, or Monsanto technical reports on this popular material. Write, wire, or phone: MONSANTO CHEMICAL COMPANY, 30 Rockefeller Plaza, New York 20, N. Y.

New Applications of a Basic Principle...

Now serve a Wide Range of Industries

● Ingenuity and skill in applying sound engineering principles effectively have been distinguishing features of IOI installations from its earliest days. Today, these same qualities characterize the many new IOI systems which are increasing production and lowering costs for industrial leaders in many different fields . . . in every part of the world where men are concerned with continuous materials handling and oven treating in industrial processing.

PLASTIC AND SYNTHETIC INDUSTRIES

Continuous—extrusion coating systems
—impregnation systems
—curing and polymerizing ovens

TEXTILE INDUSTRY

Continuous—coated fabric systems
—textile dryers
—festoon dryers
—textile takeup stands
—calendering systems
—flocking systems
—latex systems

HEAT TREATING

Continuous—draw furnaces
—dehydrogenizing ovens
—aging ovens
—blueing ovens
—thermal shock systems

WIRE INDUSTRY

Continuous—insulation lacquering systems
—tension, windup machines
—windup and unwind systems
—saturation systems
—drying and pre-heating rooms

FERROUS WIRE AND ROD

Continuous—dehydrogenizing ovens
—welding rod coating ovens

RUBBER INDUSTRY

Continuous—cementing systems for synthetic tire fabric
—dipping systems for synthetic tire fabric
—belt cord impregnation systems
—processing units for rubber tubing and hose tire carcass dryers
—rubber curing ovens

METAL FINISHING

Continuous—finishing systems
—conveyor ovens of all types

INDUSTRIAL IOI ENGINEERING VERSATILITY **OVENS, INC.**

13825 TRISKETT ROAD CLEVELAND 11, OHIO

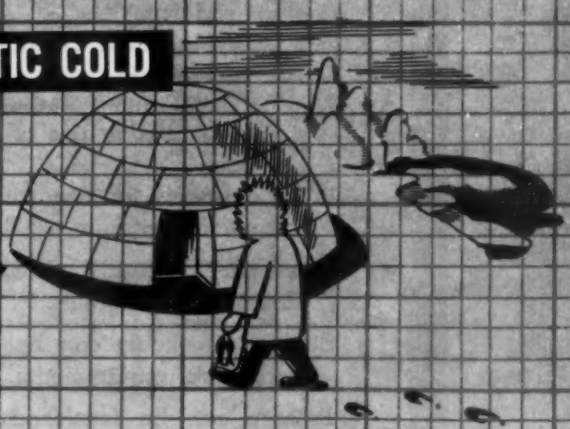
ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON W.1, ENGLAND

BAKER *plasticizers*

from TROPIC HEAT

are unexcelled for retained FLEXIBILITY

to ARCTIC COLD



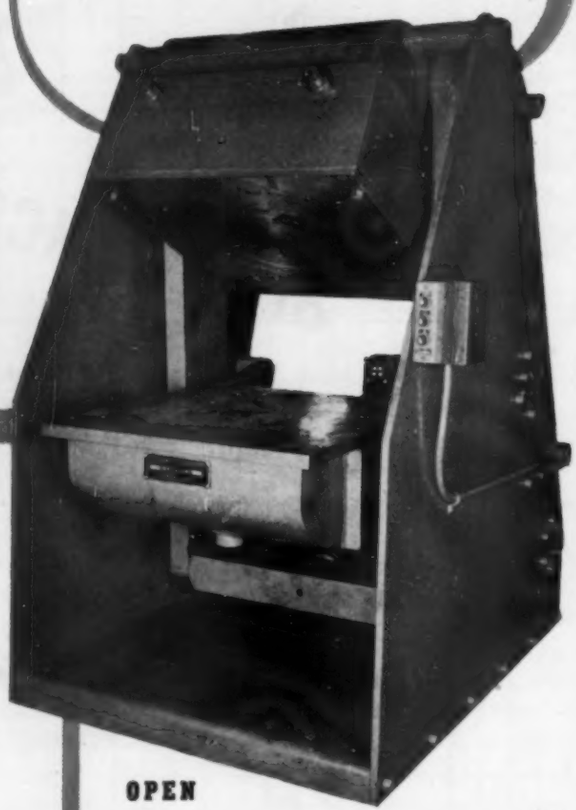
The BAKER CASTOR OIL COMPANY Established 1857

120 Broadway, New York, N. Y. • Chicago, Illinois • Los Angeles, California

STANMOCO
hydraulic toggle presses

EQUIPPED WITH KNOCKOUTS OFFER BIG LABOR SAVINGS

CLOSED



OPEN

Specifications

Platens	34"x 34"
Maximum Opening	14½"
Pressure	200 Tons

Operation: Manual or automatic through use of cycle timers.

Press designed for use with 750 pounds hydraulic oil pressure.

Press can be furnished with or without hydraulic pumping unit.

Special knockouts can be furnished to meet individual requirements.

Presses can be furnished complete with molds and knockouts for any special molding job.

Write for complete details

The Akron Standard Mold Co.
Akron — *The Established Measure of Value* — Ohio

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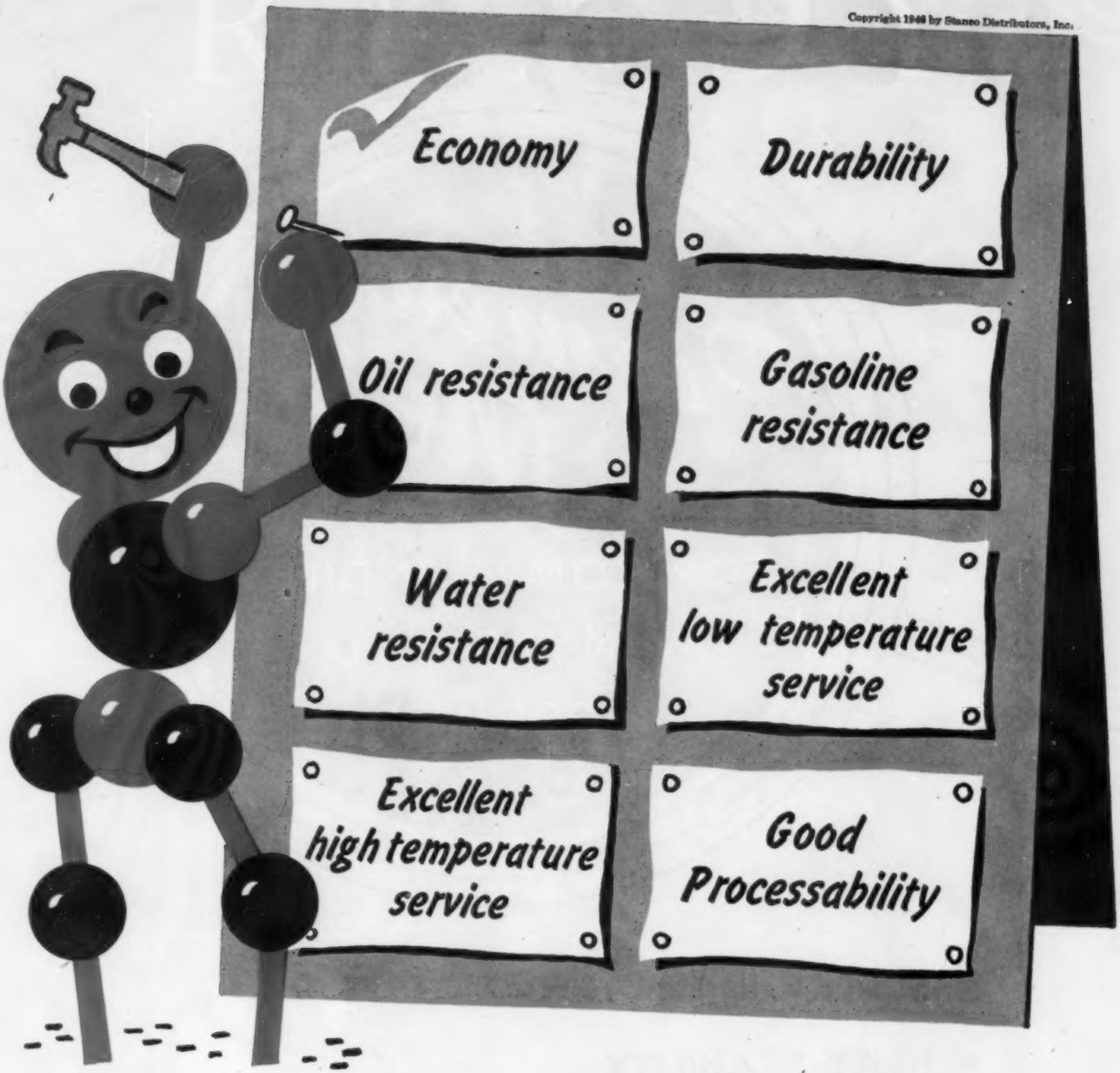


Perbunan synthetic rubber offers 8 service features!

Get all the important features of this high quality synthetic rubber. *Compound with Perbunan and you combine product quality with profit.*

Stanco Rubber Technologists know how to develop rubber parts from Perbunan . . . economically. Get in touch with them at the office nearest you.

PERBUNAN
REG. U. S. PAT. OFF.

THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

STANCO DISTRIBUTORS, INC., 26 Broadway, New York 4, N. Y.; First Central Tower, 106 So. Main St., Akron 8, Ohio; 211 North La Salle St., Chicago 1, Illinois; 378 Stuart St., Boston 17, Massachusetts. West Coast Representatives — H. M. Royal Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in New Jersey, Illinois, California, Louisiana, and Ohio.

IT'S "TOPS"

- **SUPERIOR ELECTRICAL TESTS**
- **HEAT STABILITY**
- **COLOR**

Sample and technical data sent promptly on request

MOORE & MUNGER

33 RECTOR STREET

NEW YORK

READY!

Every pound of UNITED BLACKS is ready when it leaves the plant for an exacting job ahead. A wealth of manufacturing experience, together with careful supervision and scientific control, has made UNITED BLACKS the talk of the rubber industry for enviable performance. So,—standardize on UNITED BLACKS for top quality, uniformity, and dependability.

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO

DESIGNED FOR HANDLING

UNITED BAGS claim attention everywhere with their distinctive colored markings. Each type—SRF, HMF, EPC—is the answer for the exacting compounder and is acclaimed for performance in the millroom and on the road. Standardize on UNITED BLACKS to attain perfection in rubber products.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston 27, West Virginia

SAVE TIME AND MONEY WITH

PC FOAMGLAS INSULATION

AN important cost factor in insulating jobs is the labor cost of installing the insulating material. And men who have used many kinds of insulation can tell you that PC Foamglas is so light in weight, so conveniently packaged, that it can be installed more quickly by fewer men — saving both time and money.

PC Foamglas, the cellular glass insulation, is fireproof, waterproof and verminproof. It is unaffected by excessive humidity, impervious to common acids. It therefore retains its original insulating efficiency indefinitely, without repairs or maintenance. That means protection against the additional cost which is incurred when defective insulating material has to be torn up and replaced.

In walls and floors, on flat deck roofs, of all sorts of plants all over the country, PC Foamglas is helping to maintain desired temperature levels, to minimize condensation, economically, *permanently*.

You will find a lot of helpful information in our manuals on PC Foamglas insulation. Lavishly illustrated, they contain valuable engineering data, tables, charts and installation details. Check your choice on the convenient coupon, mail it to us and free copies of our booklets will be sent to you promptly, without obligation. Pittsburgh Corning Corporation, Room 204, 632 Duquesne Way, Pittsburgh 30, Penna.

· Also Makers of PC Glass Blocks ·

PC FOAMGLAS *Waterproof Fireproof* **INSULATION**

T. M. REG. U. S. PAT. OFF.

LIGHT IN WEIGHT, rigid and strong, PC Foamglas is conveniently packaged for easy handling on the job. It can be installed quickly by minimum crews, thus saving time and labor cost.

Pittsburgh Corning Corporation
Room 204, 632 Duquesne Way
Pittsburgh 22, Pa.

Please send me without obligation, your free booklets on the use of PC Foamglas insulation for:

Roofs_____ Walls_____ Floors_____

Name_____

Address_____

City_____ State_____

We have been supplying scrap rubber, scientifically sorted and graded, since the birth of the rubber industry

Jack Sider • *J. K. McElligott*
PRESIDENT EXECUTIVE VICE-PRES.

Since 1868

The **LOEWENTHAL** *Co.*

188 W. Randolph St., Chicago 1, Ill. • 159 Clewell St., Akron 5, Ohio • Cable Address: "GYBLOWELL"

KNOWN THE WORLD OVER

NAUGATUCK

Latex

SYNTHETIC

AND HEVEA

NAUGATUCK CHEMICAL

Division of United States Rubber Company

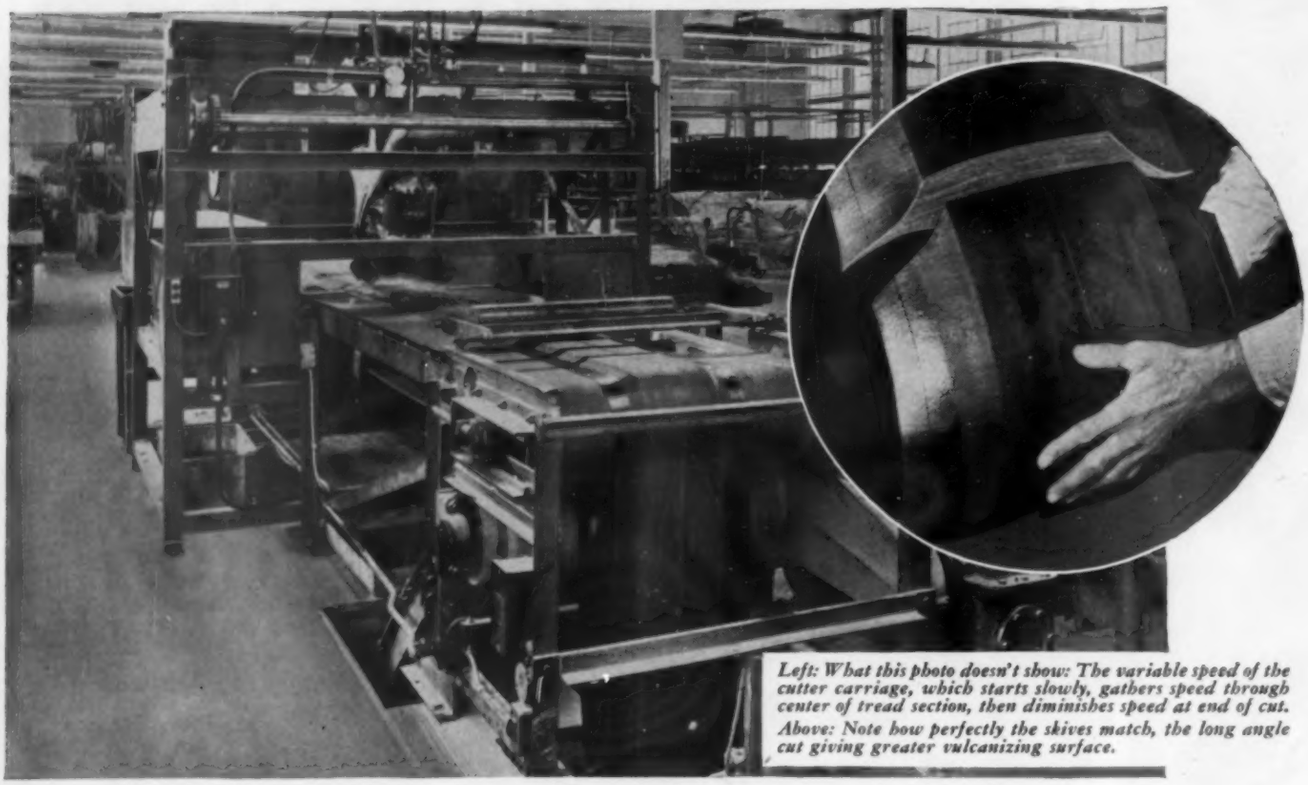
1230 AVENUE OF THE AMERICAS · NEW YORK 20, N. Y.

BRANCHES: AKRON · BOSTON · DETROIT · NAUGATUCK

Designed For Accuracy!

Save Time, Material, Labor with the New

NRM MODEL 46 TREAD SKIVER



Left: What this photo doesn't show: The variable speed of the cutter carriage, which starts slowly, gathers speed through center of tread section, then diminishes speed at end of cut.
Above: Note how perfectly the skives match, the long angle cut giving greater vulcanizing surface.

WE wish we could show you a movie which would tell more quickly than words . . . how smoothly and accurately the new NRM Model 46 Tread Skiver goes about its job.

First, you'd see that this machine skives on the fly, in one direction only, with a big 20″ diameter blade. Although it's water-lubricated, you'd notice there's no wasting of water. Following the cut tread sections down the line, a close-up picture of a skive would show the steep angle of the clean cut, (variable from 15° to 45°) which matches perfectly the skive at the other end of the tread section.

Farther down the conveyor line you would see why recutting is a waste practice of the past, for check measurements of the tread sections do not vary more than ⅛″.

Well, we haven't a motion picture showing all this, and the many other advantages of the NRM Tread Skiver, so the next best step is to send you a complete technical description of the equipment and its performance record in actual production . . . Write for this additional information today.

NATIONAL RUBBER MACHINERY CO.
General Offices: AKRON 11, OHIO

Creative Engineering

FOR CERTAINTY IN CHEMICAL CONTROL

. . . *Rely on* B&A *Reagents*

For sulfur determinations, acetone extractions, or other key analyses, every step of chemical control in today's rubber laboratories calls for unerring accuracy. There, the chemist working with the precision tools of his profession safeguards the quality of natural and synthetic rubbers from the acceptance of raw materials on through to certification of finished products.

For certainty in such responsible work, depend on B&A Reagents.

These high purity products of General Chemical Company's Baker & Adamson Division are chemical micrometers for your most exacting analyses. They are made to the decimal-point accuracy of A.C.S. standards . . . and are backed by all the specialized skills and science B&A has developed in 64 years of "setting the pace in chemical purity."

Extensive stocks of B&A Reagents are carried at the Company's *own* chain of regional warehouses from coast to coast.* Use the one nearest you to fill your reagent needs. By telling the B&A Technical Serviceman your month-to-month requirements he can plan with you in building these local stocks to supply you quickly . . . conveniently . . . whenever you call.

Do you have this 200-page catalog?

If you buy or specify industrial laboratory reagents, you will find the 200-page book of B&A products an invaluable guide to 1,000 quality chemicals. *For free copy,* make request on business letterhead to nearest B&A office below.

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STANDARD OF PURITY
FINE CHEMICALS

GENERAL CHEMICAL COMPANY

BAKER & ADAMSON DIVISION

40 RECTOR STREET, NEW YORK 6, N. Y.*

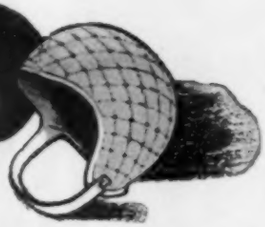
Sales and Technical Service Offices: Albany* • Atlanta • Baltimore • Birmingham* • Boston • Bridgeport Buffalo* • Charlotte* • Chicago* • Cleveland* • Denver • Detroit* • Houston • Kansas City Los Angeles* • Minneapolis • New York* • Philadelphia* • Pittsburgh* • Providence • St. Louis* San Francisco* • Seattle • Wenatchee (Wash.) • Yakima (Wash.)
In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal* • Toronto* • Vancouver*

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

* Complete stocks carried here.

TITANOX . . . *the brightest name in titanium pigments*

TITANOX . . .



the right choice for WHITE products

In natural or synthetic rubber, TITANOX imparts a whiteness that adds attractiveness and sales-appeal to products. A little of it goes a long way in accomplishing high whitening and strong brightening with a minimum of pigmentation.

TITANOX is effective, not only for white rubber but also for tinted stocks to which it brings tones and colors that are remarkably clear.

The good working qualities of TITANOX have resulted in a demand much greater than the output. So, if you can't get all the TITANOX you want, please bear with us. In the meantime, everything possible is being done to increase production.

TITANOX

TRADE MARK

TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT

111 Broadway, New York 6, N. Y.
104 So. Michigan Ave., Chicago 3, Ill.
330 Townsend St., San Francisco 7, Cal.
2472 Enterprise St., Los Angeles 21, Cal.

You'll want PARAPLEX G-25

PARAPLEX G-25, an unusual resinous polyester, has proved itself to be an outstanding plasticizer. In applications where the finished compound must retain its original physical characteristics to the maximum . . . in free films and other applications of vinyl resin compounds . . . PARAPLEX G-25 has improved products by giving them the following advantages:

1. PERMANENCE
2. LOW FLAMMABILITY
3. FLEXIBILITY AT LOW TEMPERATURES
4. HEAT STABILITY
5. NON-EXTRACTIBILITY
6. NON-MIGRATABILITY
7. FREEDOM FROM ODOR AND TASTE
8. RESISTANCE TO WEATHERING AND ULTRA VIOLET

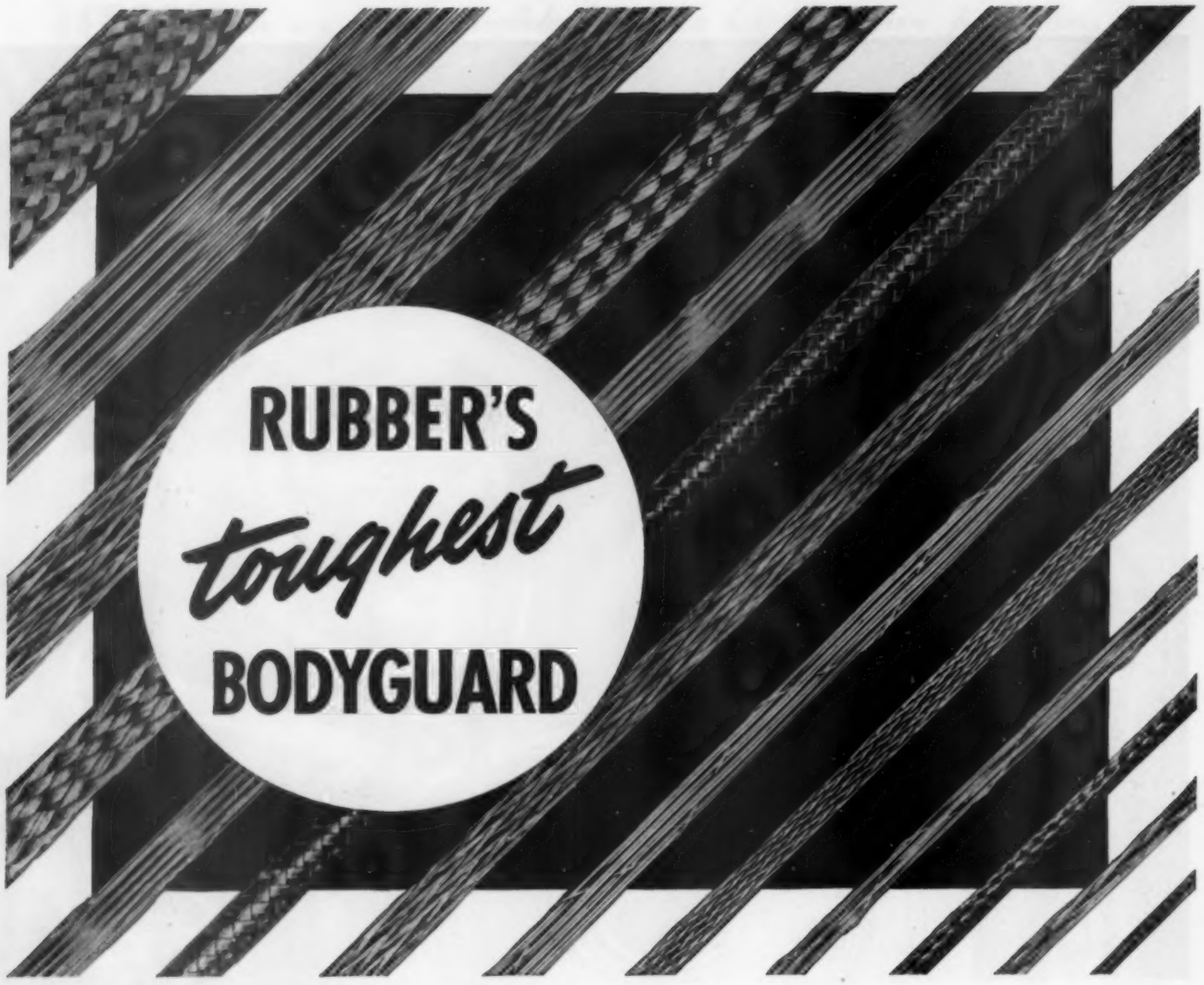
You'll find PARAPLEX G-25 truly unique, combining the desirable features of ester-type plasticizers with the resistance and permanence obtainable only in a synthetic resin plasticizer. Investigate its advantages today. We'll send you detailed information upon request.

PARAPLEX *is a trade-mark, Reg. U. S. Pat. Off.*

THE RUBBER CHEMICALS DEPARTMENT

THE RESINOUS PRODUCTS & CHEMICAL COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.



ALMOST 40 years ago we started a job here at National-Standard that's grown bigger and bigger with each passing year. That job is the application of fine wire to rubber—to support rubber and greatly extend its usefulness . . . to give rubber products unprecedented strength and life.

Today you have only to look at the amazing work records of wire-reinforced products to realize that wire has become rubber's toughest, most capable bodyguard—in tires, V-belts, flat belts, conveyor belts, tubes, conduit, hose, and scores of other products.

The tubular and flat braids, tapes and metallic strands shown above are just a few of the fine wire structures specially engineered by National-Standard for these and many more wire-and-rubber applications—painstakingly developed and precision-produced to help make new and improved products practical and profitable for manufacturer and user alike.

As always, we at National-Standard welcome the opportunity to work with you in the planning of your products. Perhaps you too stand to gain with a specially developed wire or fabrication. Possibly we can also contribute in the development of cost-saving machinery for the application of your wire. In any case, our specialized engineering service is at *your* service, now, or at any time.

NS
NATIONAL-STANDARD
Division
NATIONAL-STANDARD COMPANY

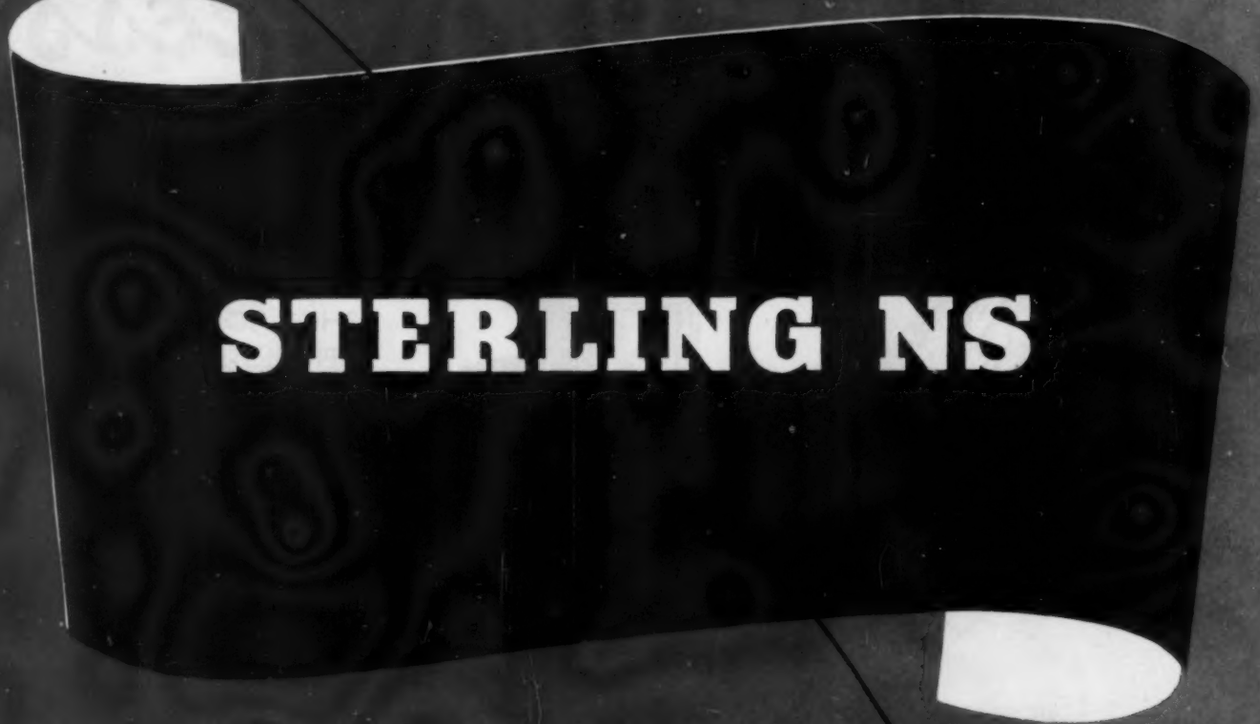
DIVISIONS OF NATIONAL-STANDARD COMPANY

NATIONAL-STANDARD
Niles, Mich.
Tire Wire, Fabricated Braids and Tape

ATHENIA STEEL
Clifton, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

WORCESTER WIRE WORKS
Worcester, Mass.
Round Steel Wire, Small Sizes

WAGNER LITHO MACHINERY
Jersey City, N. J.
Lithographing and Special Machinery



STERLING NS

White sidewall tires are on the way back, and in Sterling NS Cabot has the right carbon black for the compound. Sterling NS is the result of a development program to find a new extract-free, SRF* black suitable for white sidewall tires, door strips and all other purpose where specifications called for a carbon black non-staining in nature.

CABOT

*Semi-reinforcing Furnace Black.

GODFREY L. CABOT, INC., 77 FRANKLIN STREET, BOSTON 10, MASS.

FORMULA *for Success*

VINYL RESINS

HARFLEX* **PLASTICIZERS**

CABLE COATINGS
SAFETY GLASS
RAINCOATS
HANDBAGS
LUGGAGE
SHOE SOLES
UPHOLSTERY FABRICS
FLOOR COVERINGS

Success is assured for your finished product when you use HARFLEX Plasticizers. The Harflex Series is a complete line of plasticizers for vinyl resins, synthetic rubbers and other plastics and elastomers.

Due to present raw material shortages you may be unable to secure all of the Harflex Plasticizers you need. We are doing our best to supply the ever increasing demand for these high quality products, and we are looking forward to the day when raw materials will again be available in sufficient quantity to supply everyone's needs.

In the meantime consult us if you have a plasticizer problem. Our technical staff will be glad to assist you.

*Trade Mark

BINNEY AND SMITH CO.
DISTRIBUTOR TO THE RUBBER INDUSTRY

HARDESTY CHEMICAL COMPANY, INC.

HARCHEM

41 EAST FORTY-SECOND STREET, NEW YORK 17, N.Y.

these advantages in RAYON . . .

RAYON FILAMENTS ARE CONTINUOUS

Rayon is produced in long continuous strands, as contrasted with short natural fibers, which average approximately 1¼" in length, and must be twisted together to form yarn.

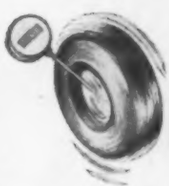
RAYON FILAMENTS ARE SOLID, MORE UNIFORM

The solid and rod-like formation of rayon filaments eliminates the great variance in diameter and wall thickness common in natural fibers.

give these advantages in TIRES !

COOLER RUNNING

Rayon cord, being stronger, makes a lighter tire that generates less heat. The continuous strands, unlike the shorter fibers of natural cord, need no moisture to hold them together, maintain higher tensile strength under any running conditions.



LONGER LIFE

Tests have proved that rayon cord tires give longer life in rough cross-country travel and long distance hauling. Being thinner and lighter, they generate less heat, reducing the danger of heat breakdowns.

LIGHTER

Because they are made of solid, more uniform filaments, rayon cords are stronger per unit of weight. Less rubber and less cord are required to obtain the same strength, and a lighter-weight tire results.

SAFER

There are fewer blowouts and road failures with rayon cord tires. Operators of bus and truck fleets have reported highly improved safety records as a result of rayon.

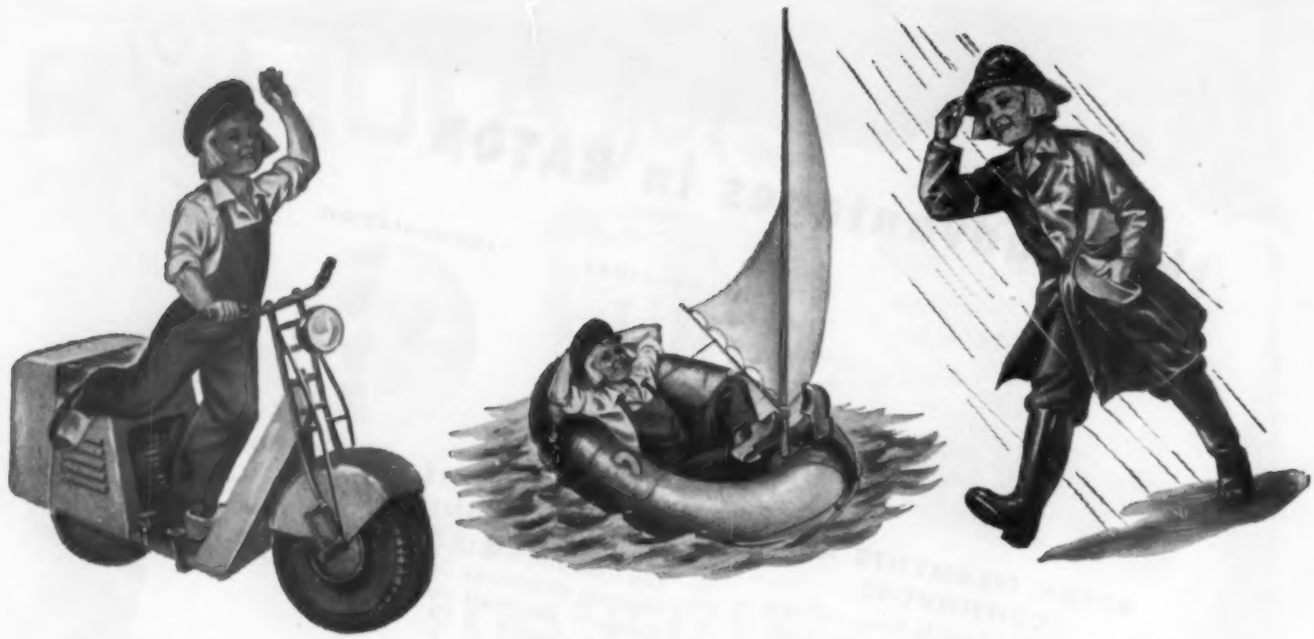
For the complete story of rayon cord tires, read "Rolling on Rayon". Send for your free copy today.

TYRON *Reg. U. S. Pat. Off.

rayon for tires

Made by INDUSTRIAL RAYON CORPORATION

Cleveland, Ohio



For Tires.. or Boats... or Rainproof Coats...

"If it's made with RUBBER ...it's better made with RED LEAD"

CHECK THESE REASONS FOR COMPOUNDING RUBBER WITH #2 RM RED LEAD

1. Improved Heat Stability—Retention of Elasticity
2. Lower Heat Build-up—Cooler Running
3. Economical
4. Faster Curing Rate
5. Extended Curing Range
6. Excellent General Physical Properties
7. Safe Processing

In almost every field...tires or soles or plugs for bowls ...*if it's made with Rubber, Red Lead will make it better.*

Manufacturing experience has emphatically confirmed our earlier tests, and established that compounding rubber with #2 RM Red Lead gives the worthwhile benefits listed at the left.

If you make tires, *all seven* advantages are yours, while *most* of them apply with other products, too...regardless of whether you're working with GR-S, GR-S-10, GR-M, GR-A, GR-I, natural rubber or vinyl elastomers.

Technical literature and counsel on your specific application will be supplied upon request to the Rubber Division of our Research Laboratories, 105 York Street, Brooklyn 1, N.Y.

NATIONAL LEAD COMPANY

New York 6; Buffalo 3; Chicago 8; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 10; Boston 6; (National Lead Co. of Mass.) Philadelphia 7, (John T. Lewis & Bros. Co.); Pittsburgh 30, (National Lead Co. of Pa.); Charleston 25, W.Va., (Evans Lead Division).

ACCELERATORS
PLASTICIZERS
ANTIOXIDANTS

A Complete Line of Approved Compounding Materials

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

AKRON OHIO, • LOS ANGELES, CALIF. • CHICAGO, ILL.

WELCOME TO OUR NEW HOME

PRECISION PS SCIENTIFIC

Precision Scientific Company

3737 CORTLAND STREET • • • CHICAGO 47, ILL., U.S.A.

Scientific Research and Production Control Equipment

Welcome TO OUR NEW HOME

We wish to thank our many customers, whose continued use of "Precision Products" has made this fine new plant possible . . . over 130,000 sq. ft. devoted exclusively to the manufacture of Scientific Research and Production Control Equipment. We salute with deep pride and sincere admiration every laboratory man, from director to the newest technician; their untiring patience has given our country the greatest technological developments the world has ever seen. Again we say —

"THANK YOU" and "WELCOME TO OUR NEW HOME"

Plasticizers

Resin Intermediates

Mold Lubricants

Solvents

Accelerator Intermediates

Emulsion Chemicals

CALL THE OFFICE NEAREST YOU

Albany 7, N. Y.	50 State Street	Albany 5-7502
Baltimore 2, Md.	231 East North Avenue	SAratoga 0179
Boston 16, Mass.	137 Newbury Street	COMmonwealth 4520
Buffalo 2, N. Y.	424 Main Street	WAshington 9916
Charlotte 2, N. C.	116½ South Church Street	Charlotte 4-4107
Chicago 1, Ill.	230 North Michigan Avenue	RANdolph 8633
Cincinnati 6, Ohio	920 East McMillan Street	AVon 4450
Cleveland 14, Ohio	1517 Superior Avenue	CHerry 5366
Detroit 2, Mich.	3011 West Grand Boulevard	TRinity 1-4265
Indianapolis 4, Ind.	729 North Pennsylvania Street	RIley 3577
Los Angeles 11, Calif.	2305 East 52nd Street	KImball 8253
Newark 2, N. J.	1060 Broad Street	MArket 3-8665
New York 17, N. Y.	30 East 42nd Street	MUrray Hill 2-6800
Philadelphia 22, Pa.	1649 North Broad Street	FRemont 7-6551
Pittsburgh 19, Pa.	311 Ross Street	COurt 2155
San Francisco 4, Calif.	114 Sansome Street	DOuglas 1640
Seattle 4, Wash.	2901 First Avenue South	MAin 6247
St. Louis 8, Mo.	3615 Olive Street	FRanklin 6390

SYNTHETIC ORGANIC CHEMICALS

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

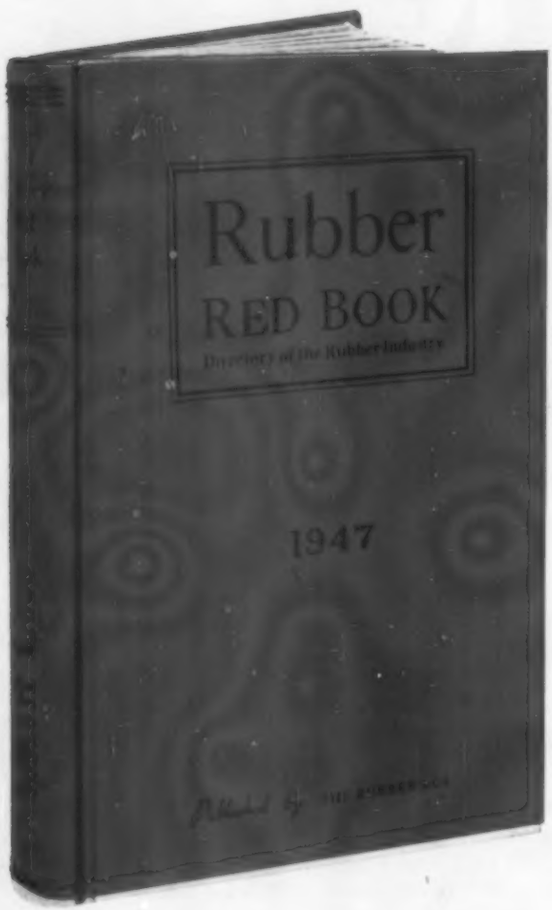
UCC

30 East 42nd Street, New York 17, N. Y.

Scientific Research and Production Control Equipment

FIRST ANNOUNCEMENT

Plan Now for Space in the 1947 RUBBER RED BOOK!



The Sixth Issue of the RUBBER RED BOOK —the 1947 Edition—will be published in June, 1947.

If you budget your advertising in advance, do not fail to include this outstanding Directory on your list . . . it is *not too early* to reserve space now for the coming year in this essential advertising medium!

The last issue of the RUBBER RED BOOK—the 1945 issue—was the largest ever published, with a total of 696 pages and 242 advertisers. The demand for that issue was so great that inside of three months the complete edition, limited to 3100 copies by paper restrictions, was completely exhausted!

There is, accordingly, a tremendous interest in the 1947 edition as further evidenced by the hundreds of advance orders already on hand. We will spare no effort to bring out the 1947 issue early and the press run will be increased to meet the steadily rising demand.

You, as an advertiser, can capitalize on this situation by making sure as soon as possible that you are represented with ample space in the 1947 edition.

The RUBBER RED BOOK is without a doubt the most indispensable and widely used book in the rubber industry today! It is consulted daily by the industry's key men—buyers, technologists, plant executives and many others—as their primary source of buying information.

What better place then, to tell the story of your products and services than in effective display advertising in the RUBBER RED BOOK? Plan now to use adequate space in the 1947 edition!

Despite higher production costs, we are determined to hold the line on prices as long as possible; therefore there will be no change in basic advertising rates over the 1945 edition. Color charges are however necessarily somewhat higher. (See accompanying box for condensed rate data).

Reserve your space today! Your advertisement in the 1947 edition will pay you dividends until 1949!

1947 EDITION
Cost of Space

1 page	$100.	2 pages	$190.
½ page	55.	2 half pages ..	106.
¼ page	30.	2 ¼ pages ...	58.
Colors — Red		extra,	40.
Other Colors		extra,	60.
Bleed Pages		extra,	20%

Inserts — Not Accepted

For complete rates and mechanical requirements, write for rate card

Published by

RUBBER AGE

250 W. 57th St., New York 19, N. Y.

low cost

PHILLIPS RUBBER COMPOUNDING MATERIALS

high quality *easily handled*

Phillips Rubber Compounding Materials are distinguished by low cost, high quality and ease of handling. Specifications, characteristics and their behavior in rubber are remarkably uniform. Three products of outstanding merit are:

PHILLIPS RECLAIMING RESIN NO. 1

PHILPLAST NO. 1

PHILPLAST NO. 2

Phillips Reclaiming Resin No. 1 is a free-flowing petroleum product recommended for digester reclaiming. The high penetrating characteristic of this material promotes the swelling of, and thus facilitates the conversion of scrap to a plastic state.

Philplast No. 1 is a petroleum-base product compatible with both natural and synthetic rubbers. Viscosity and pour point are low enough that it may be easily processed in the factory without pre-heating. Excellent aging characteristics, plasticizing action and no retardation of cure are typical advantages of Philplast No. 1.

Philplast No. 2 is a plasticizer-extender of unique chemical structure. Possessing a low viscosity and pour point, Philplast No. 2 exhibits a high compatibility with both natural and synthetic rubbers and is recommended where compounds with the following properties are desired:

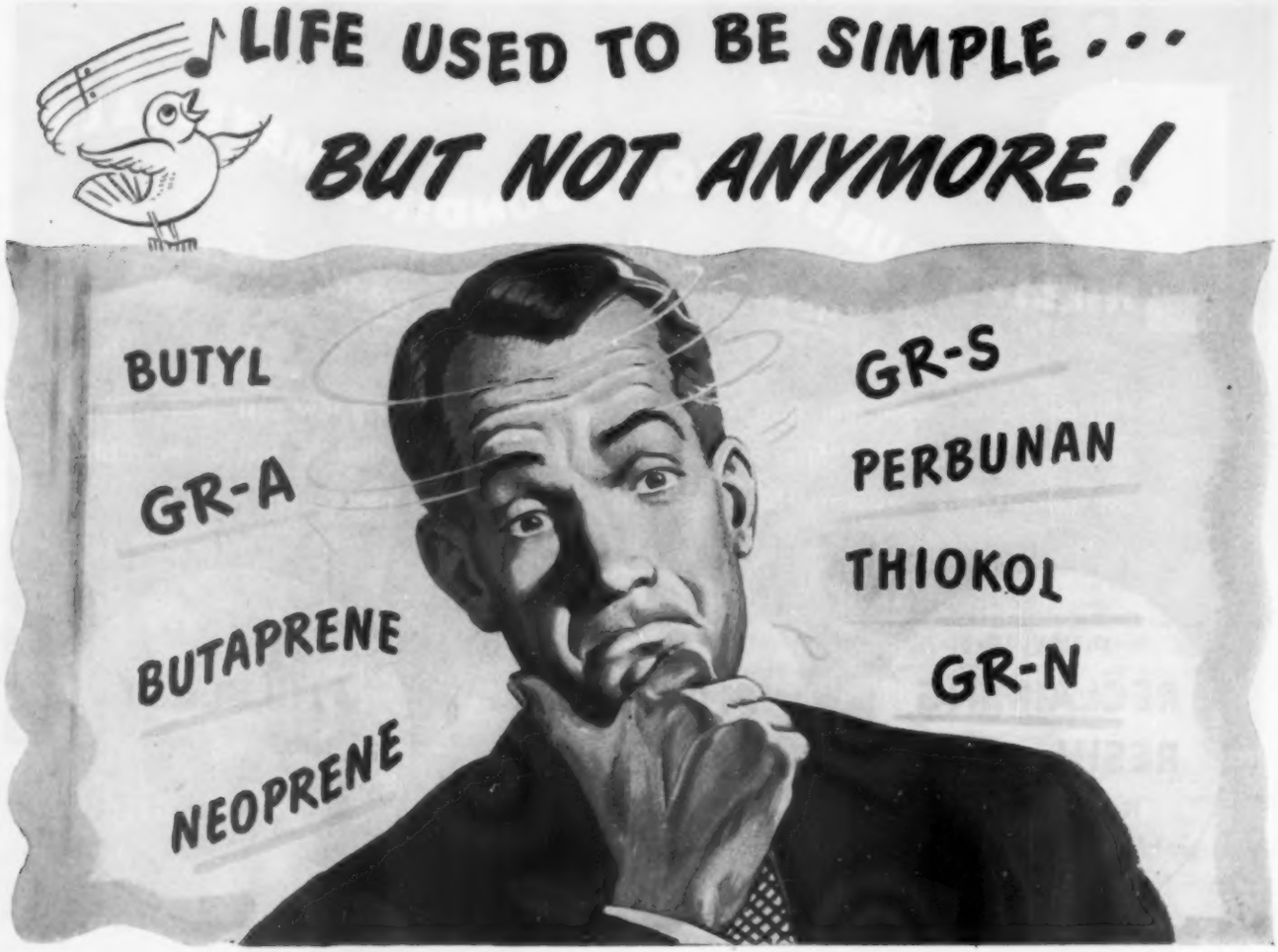
LOW HYSTERESIS
GOOD ABRASION **LEVEL CURING**

A brochure containing complete technical data on Philplast is now available. A request on your letterhead will bring your copy.

PHILLIPS PETROLEUM COMPANY

Chemical Products Department

BARTLESVILLE, OKLAHOMA



SYNTHETIC RUBBER helped win the war—but, oh brother! it brought a lot of headaches, too.

For synthetics changed a simple sorting process into a complex problem. Only painstaking checking and rechecking, much like they do in laboratories, can hope to do the job successfully from this point on.

As long as there's a use for synthetic rubber—and we believe it's here to stay—we'll continue to give freely of the extra time and energy the job demands...so that *you* can be sure of what you're getting.

H. MUEHLSTEIN & CO.
INC.

122 EAST 42nd STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: New York • Akron • Chicago • Boston • Los Angeles • Memphis

WAREHOUSES: Jersey City • Akron • Boston • Los Angeles • Memphis

If you are not thoroughly familiar with these Columbia pigments, it may be profitable for you to investigate. Data gained from actual plant experience and working samples are yours on request. Write today.

CALCENE*T—A specially prepared, finely divided, coated, precipitated calcium-carbonate product—confers high tensile strength, resistance to tear and abrasion, low modulus, smooth, fast extrusion and good general processing properties to rubber stocks. A pigment of wide utility which is helping to solve many rubber compounding problems.

SILENE*EF—The nearest approach to a "white carbon black." A white, precipitated, hydrated calcium silicate of extremely fine particle size—confers high modulus, hardness, tear resistance, and good tensile strength up to high loadings. Its use is constantly expanding for many light or dark-colored synthetic and natural rubber products.

*Trade marks registered U. S. Patent Office

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY
COLUMBIA CHEMICAL DIVISION

FIFTH AVENUE at BELLEFIELD, PITTSBURGH 13, PENNA. • Chicago • Boston • St. Louis
Pittsburgh • New York • Cincinnati • Cleveland • Philadelphia • Minneapolis • Charlotte • San Francisco

COLUMBIA ESSENTIAL INDUSTRIAL CHEMICALS
Soda Ash · Caustic Soda · Liquid Chlorine · Sodium Bicarbonate · Pittchlor *(Calcium Hypochlorite)* · Silene EF *(Hydrated Calcium Silicate)* · Calcium Chloride · Soda Briquettes *(Iron Desulphurizer)* · Modified Sodas · Caustic Ash · Phosflake *(Bottle Washer)* · Calcene T *(Precipitated Calcium Carbonate)*

SYNTHETIC RUBBER & RESIN COMPOUNDS

Custombuilt

FOR YOUR PRODUCT OR PROCESS

A few Applications of GENERAL LATEX Product Development

Aircraft Cements
Carpet Backing
Can Sealing
Cable and Wire
Combining Compounds
General Adhesives
Hose and Belting
Impregnating Compounds
Pile Fabrics
Protective Clothing
Shoe Adhesives
Sizings

A practical approach to the use of synthetic dispersions in your product is to refer your problem to our laboratory. No matter what the process—coating, impregnating, or bonding—our experienced technical staff can compound the material best suited to your requirements. In the case of an entirely new product, we will work out all the details of manufacturing procedure—from pilot operations to commercial production in your plant. Why not talk it over with one of our technical representatives?

GRS latex types 2 and 3, normal and concentrated, available from stock.

A Complete Service to Manufacturers

RESEARCH • MATERIALS • ENGINEERING • MANUFACTURE

General Latex & CHEMICAL CORP.

666 MAIN STREET, CAMBRIDGE, MASS.

Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government-owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

RIGHT WHERE THERE'S WEAR

Developed to build up extra "wear" properties . . . such as high abrasion resistance and resilience . . . Witco Carbon Blacks are "right" for conveyor belts, tires, shoe soles and heels, mats, stair treads, etc., in natural or synthetic formulations. Complete technical data and product listings are given in the Witco Carbon Black Manual, Catalog and Technical Bulletins. Copies will be sent promptly upon request.

WITCO CARBON BLACKS

WITCO CHEMICAL COMPANY

MANUFACTURERS AND EXPORTERS

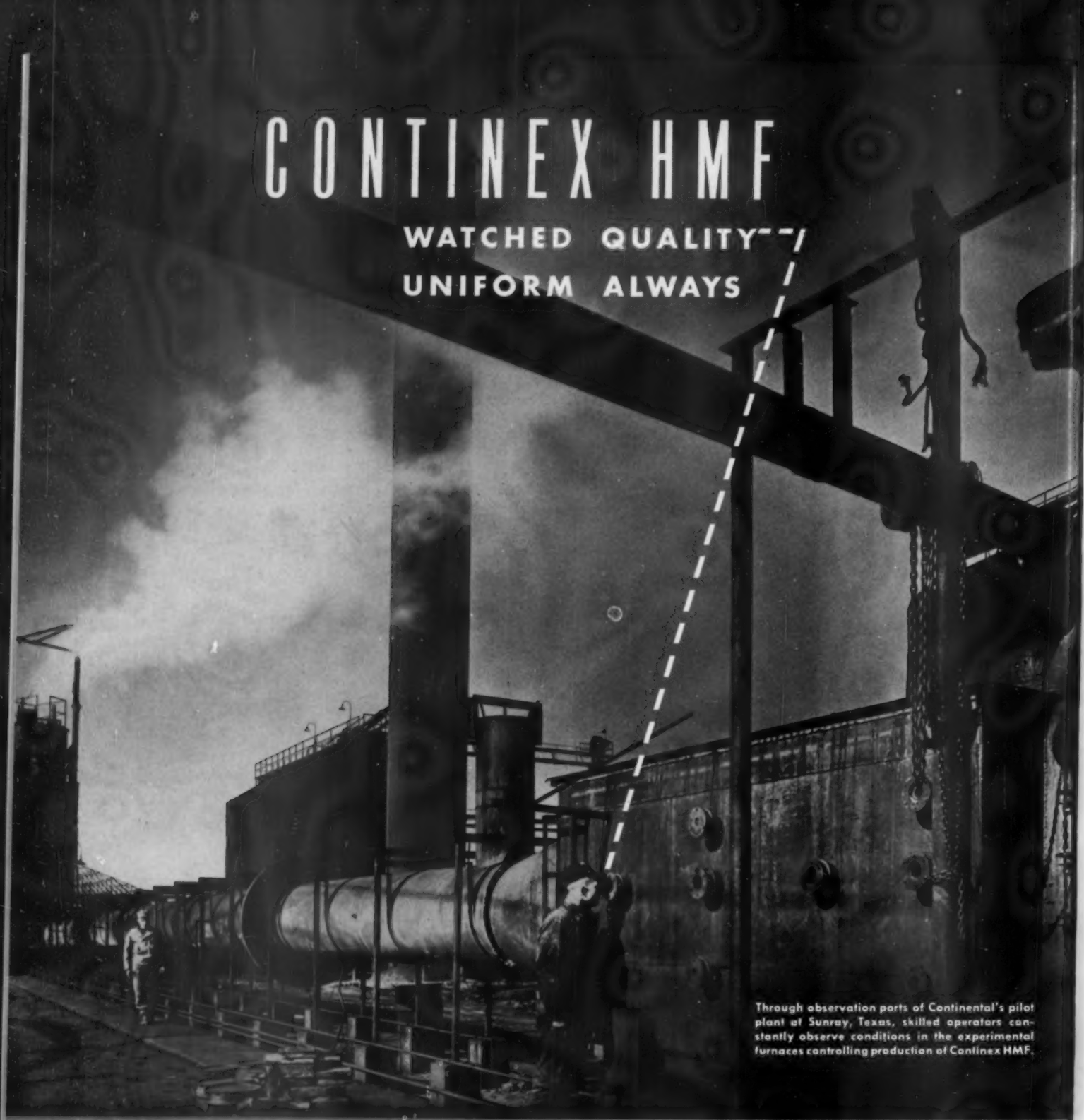
295 MADISON AVENUE • NEW YORK 17, N. Y.

LOS ANGELES • BOSTON • CHICAGO
SAN FRANCISCO • AKRON

DETROIT • CLEVELAND
LONDON AND MANCHESTER, ENGLAND

CONTINEX HMF

WATCHED QUALITY
UNIFORM ALWAYS



Through observation ports of Continental's pilot plant at Sunray, Texas, skilled operators constantly observe conditions in the experimental furnaces controlling production of Continex HMF.

● Continex HMF is quality-controlled through constant laboratory and pilot plant research to assure improved processing results in GR-S and natural and synthetic rubbers. Continex HMF combines high modulus and exceptional wear resistance (approximating that of channel black) with marked superiority in resilience and resistance to heat build-up and flex crack. Write for full technical data or a laboratory sample.

CONTINENTAL CARBON COMPANY
MANUFACTURER

WITCO CHEMICAL COMPANY
DISTRIBUTOR AND EXPORTER

CONTINENTAL CHANNEL AND FURNACE BLACKS

295 MADISON AVENUE, NEW YORK 17, N. Y.

Boston • Chicago • Cleveland • Akron
Detroit • San Francisco • Los Angeles • London

MONSANTO

Plasticizers

sulfonamide type

what

where

why

how

Monsanto Sulfonamide-type plasticizers vary in form from crystalline solids to oily liquids. They are widely compatible and are especially useful where the ordinary plasticizers cannot be used. They are excellent solvents for many dyes and resins.

These plasticizers have been used to plasticize cellulose acetate, cellulose nitrate, cellulose acetate butyrate, cellulose acetate propionate, ethyl cellulose, soy-bean protein, casein, urea formaldehyde, phenol formaldehyde, shellac, and many others.

The Sulfonamide-type plasticizers should be used where it is desired to impart gloss, flexibility, moldability, or water resistance to films, foils, or molded items. They should also be used to introduce otherwise incompatible ingredients, such as plasticizers or dyes, into lacquers or molding compounds.

Samples, technical data, and availability information will be supplied upon request. Contact MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Cincinnati, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

MONSANTO CHEMICALS

SERVING INDUSTRY ... WHICH SERVES MANKIND

"There Isn't Any Santa Claus"

SKELLYSOLVE Quality Can't Be Bought at a Lower Price

Would you expect to buy a Cadillac at Chevrolet prices? Certainly not, and just as logically, you wouldn't expect to get Skellysolve quality, Skellysolve dependability, and Skellysolve service in lower priced naphthas.

Whenever you encounter a naphtha claimed to be "as good as" or "better than" Skellysolve, but which is offered at a lower price, ask yourself: "Can I be certain of its quality and purity? Will it do the job effectively and economically? Can I count on rapid delivery and good service on all orders? Can its supplier help me out in a pinch? If its dependability, quality, and service are just as satisfactory as Skellysolve, why is it necessary for this other solvent to be offered on a 'cut price' basis? Will the supply be dependable year after year? Can I be sure of a uniform product? Will this 'cut price' solvent be available a year or two from now? If I do not obtain prompt delivery or if inferior material is received, how much will it cost in my operating results and how much will it embarrass my shipping schedules?" There isn't any question about the quality, dependability, and service of Skellysolve, because its record for the past 16 years proves its excellence. What's more, Skelly is constantly expanding its facilities in order to produce more Skellysolve as the demand grows.

Remember—Skelly Oil Company was the first large volume producer of hexane, heptane, and octane type solvents, and has faithfully served the rubber, oil and fat, ink, lacquer, and other industries with dependable Skellysolve during all these years.

SKELLY

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL COMPANY

SKELLY BLDG., KANSAS CITY, MISSOURI

Announcing

CHAMPION CLAY.....

CHAMPION CLAY is an extra fine, hard, rubber compounding clay produced by the National Kaolin Products Company, at Aiken, South Carolina . . . New developments in the grinding and drying of this fine clay, in addition to greatly expanded facilities for mining and handling, now make possible fast service on practically unlimited volume requirements . . .

This quality product and manufacturing service are now represented exclusively on sales and distribution by the Standard Chemical Company, whose technical staff will provide complete cooperation on any compounding problem.

Stocks of Champion Clay are maintained at all Branch warehouses.

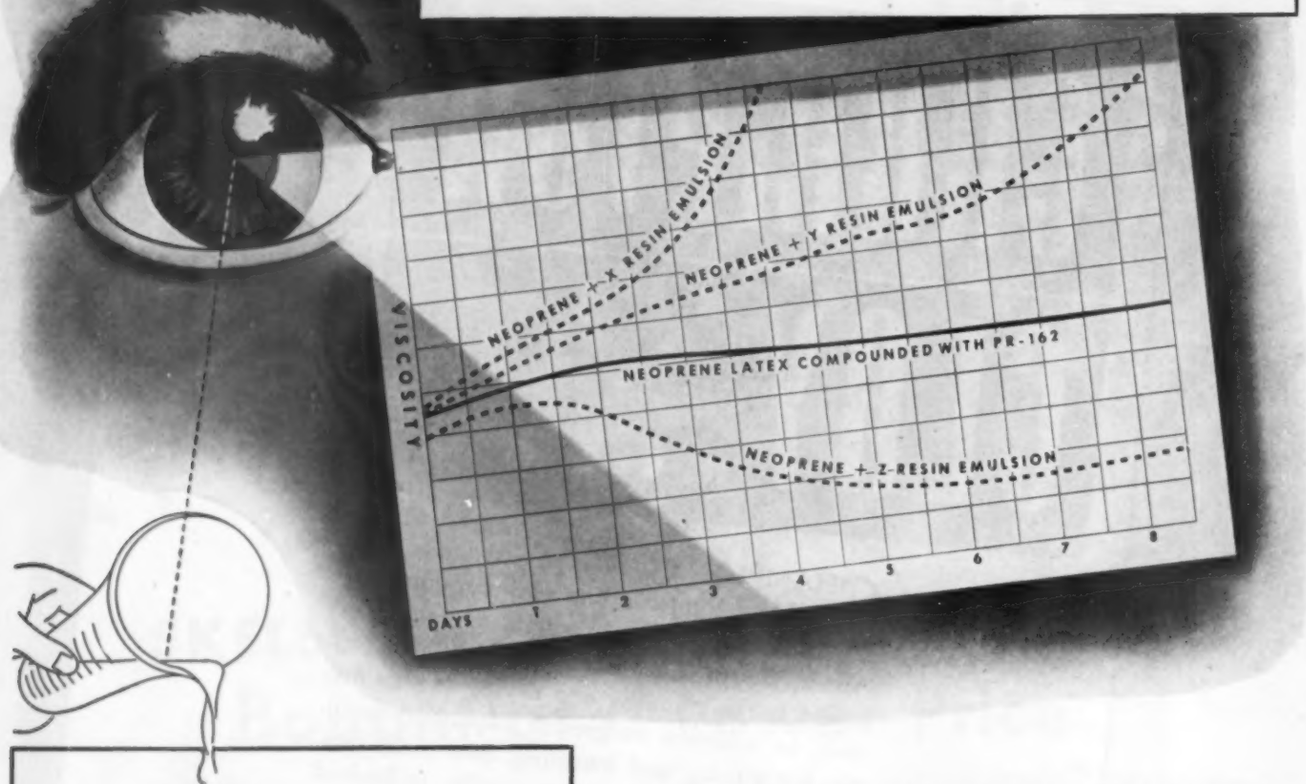
STANDARD Chemical Company

General Offices: AKRON 8, OHIO

New England: 335 Chamber of Commerce Bldg., Boston, Mass.
Mid-Atlantic: Broad Street Bank Bldg., Trenton, N. J.
Mid-West: 2724 W. Lawrence Ave., Chicago, Ill.
Pacific Coast: 1248 Wholesale St., Los Angeles, Cal.

For the *BEST* in Clay Specify CHAMPION

NEOPRENE LATEX *Extender-Tackifiers*



FACTS ABOUT PR-162

1. Is a stabilized emulsion of a special modified resin, of uniform and constant viscosity, which may be freely diluted with water (color of film when water has evaporated is clear, light amber).
2. Is ideal for extending and tackifying Neoprene Latex types 571, 572, and 571 concentrated (Also may be used with GR-S Type 3 or natural latex).
3. *Produces strong Neoprene Latex adhesives possessing building tack and pressure-sensitivity (dry tack) from a few hours up to 4 or 5 days, as desired.*
4. Resultant mixes are mechanically stable: may be brushed on or will run in most machines without coagulation (In machines where foaming usually is a problem, suitable anti-foams can be supplied on request).
5. Where permanence is required, proper treatment with anti-oxidants will result in excellent ageing in service and under accelerated ageing conditions (Suitable anti-oxidants can be supplied upon request).
6. Formulations of Neoprene Latex and PR-162 can be compounded in your own equipment or UBS will compound and ship the formulated adhesive to you.

TESTS SHOW UBS FORMULATION PR-162 GIVES MORE UNIFORM AND CONSTANT VISCOSITY

As the above graph illustrates, many Extender-Tackifier dispersions, when compounded with Neoprene Latex, show unstable viscosity tendencies as compared with UBS formulation PR-162. Users find the more uniform and constant viscosity of PR-162 an extremely important advantage in compounding Neoprene Latices.

The product of many years of practical experience with Neoprene, PR-162 is an original development of the UBS Laboratories. Write today for complete Data Sheet. Address your inquiry to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

For masking the basic odor of Neoprene Latex, we suggest using UBS Masking Perfume—Formula D6.

UBS

Serving Industry with Creative Chemistry

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3 BULLETINS YOU SHOULD HAVE . . .

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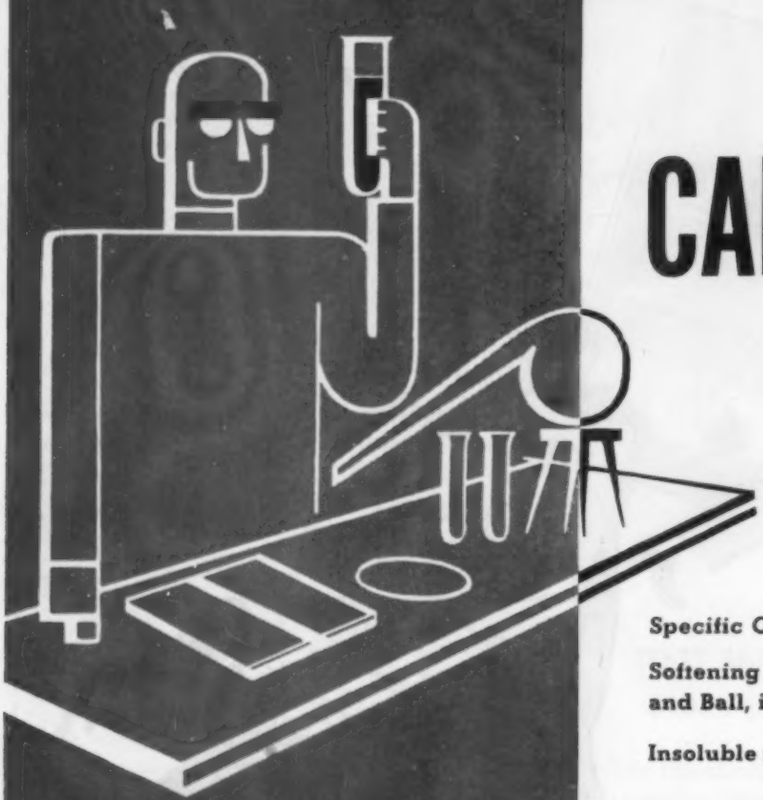

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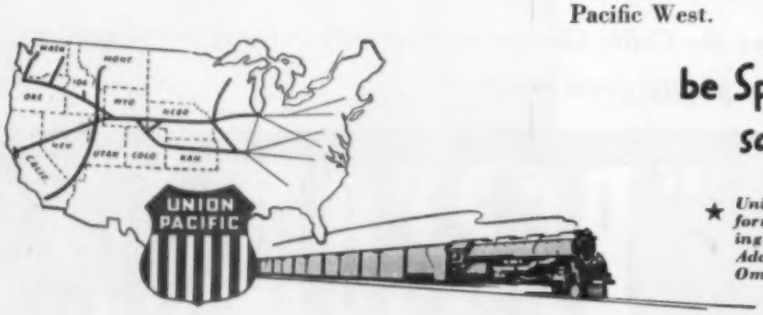

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These bulletins describe typical tire, inner tube, and mechanical goods applications (with GR-S, natural rubber, neoprene, Chemigum, Perbunan) including examples of unusual high-loaded low-cost GR-S and neoprene compounds.

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Technical Bulletin No. 28 — on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

GR-S-X-272 with 100 Parts of Zinc Oxide

THE *Office of Rubber Reserves* describes experimental polymer X-272 as follows: "Rosin Soap GR-S made to high conversion, and stabilized with one part 'Stalite'; 95-105 Mooney; acid coagulated. This rubber has good adhesiveness imparted to it by its high Mooney viscosity and the use of rosin soap."

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100°C.
7.5	1360	720	265	450	640	830	.16	41	163	57
15	2290	615	505	775	1090	1515	.14	49	99	56
30	2020	500	620	930	1400	1865	.12	52	84	46
45	2445	530	660	930	1475	2210	.15	53	81	43
60	2350	490	705	1140	1730	—	.13	53	89	41
90	2080	470	655	1040	1655	—	.11	53	78	42

Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum: Indentation in mm.	Per Cent Rebound	Shore Hardness	Compression Fatigue (Goodrich Flexometer)*: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C.	Dynamic Compression: Initial	Final	Cut-Growth Resistance Tested at 70° C. Inches Failure: 5,500 Cyc.
60	7.73	63.8	51	24.6	15'-3.0	21.8	12.8	14.4	.94

* Test Conditions: 143 lb. Load. 0.175" Stroke. 100° C. Oven Temp.

X-272, in comparison with regular GR-S, shows definitely higher reinforcement with 100 part loadings of Zinc Oxide as measured by stress-strain results. The modulus at 300% elongation is particularly outstanding. The permanent set is comparatively low. Pendulum rebound is on the high side and the heat generation, as measured by the Goodrich Flexometer, is correspondingly low. Cut-growth resistance is lower than ordinarily obtained with GR-S, but the measurements were made on a probable over-cure. Evidence is accumulating that better results with Zinc Oxide are obtained with the higher Mooney viscosity polymers.

COMPOUND No. 28

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"El-Sixty"	2.0
DPG	0.1
Coumarone-indene Resin	3.0
E.L.C. Magnesia	5.0
ZINC OXIDE	100.0

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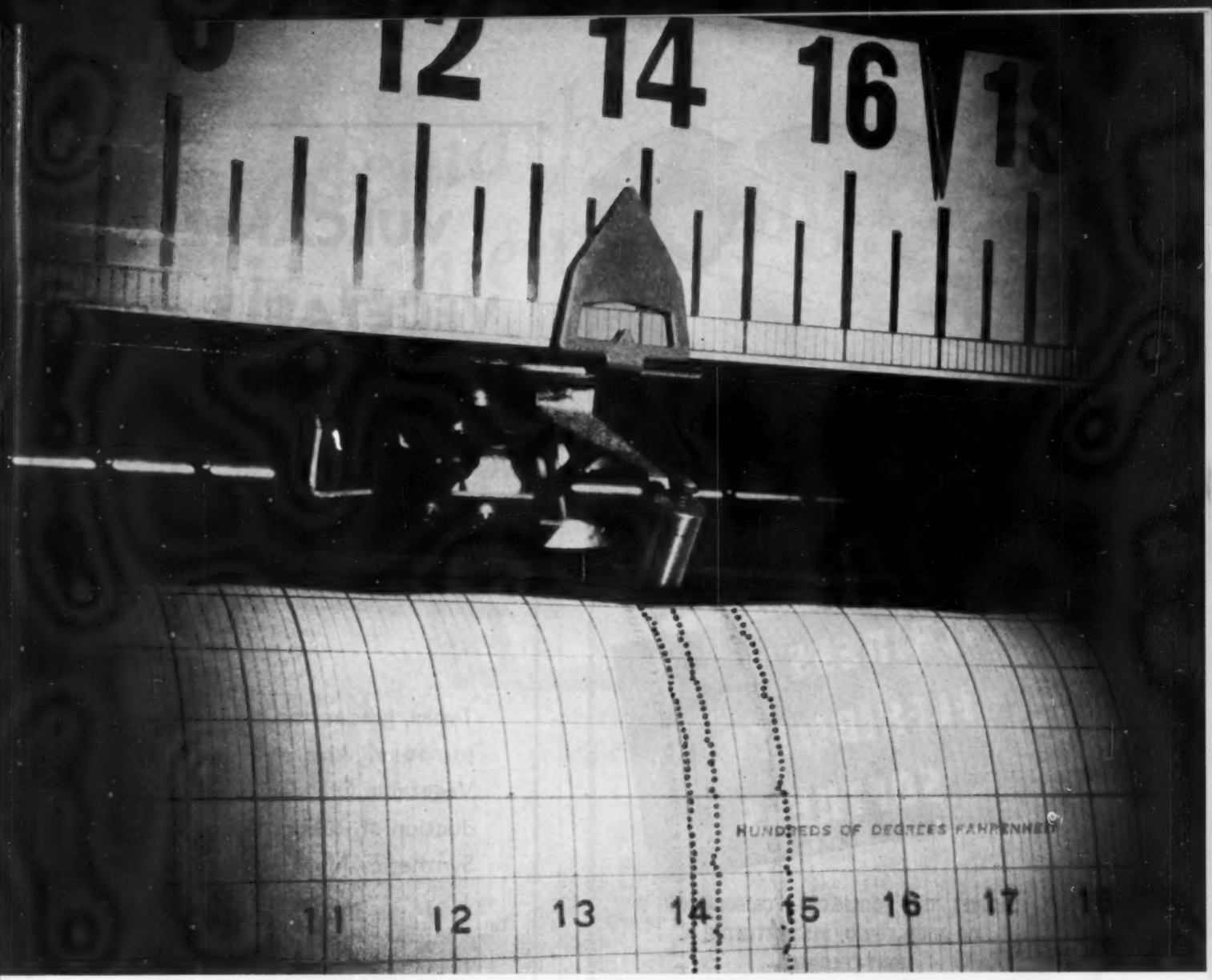

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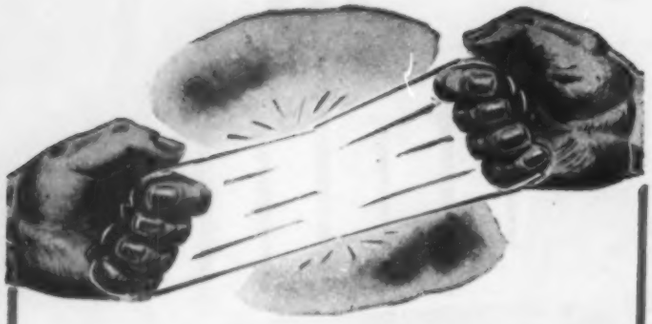

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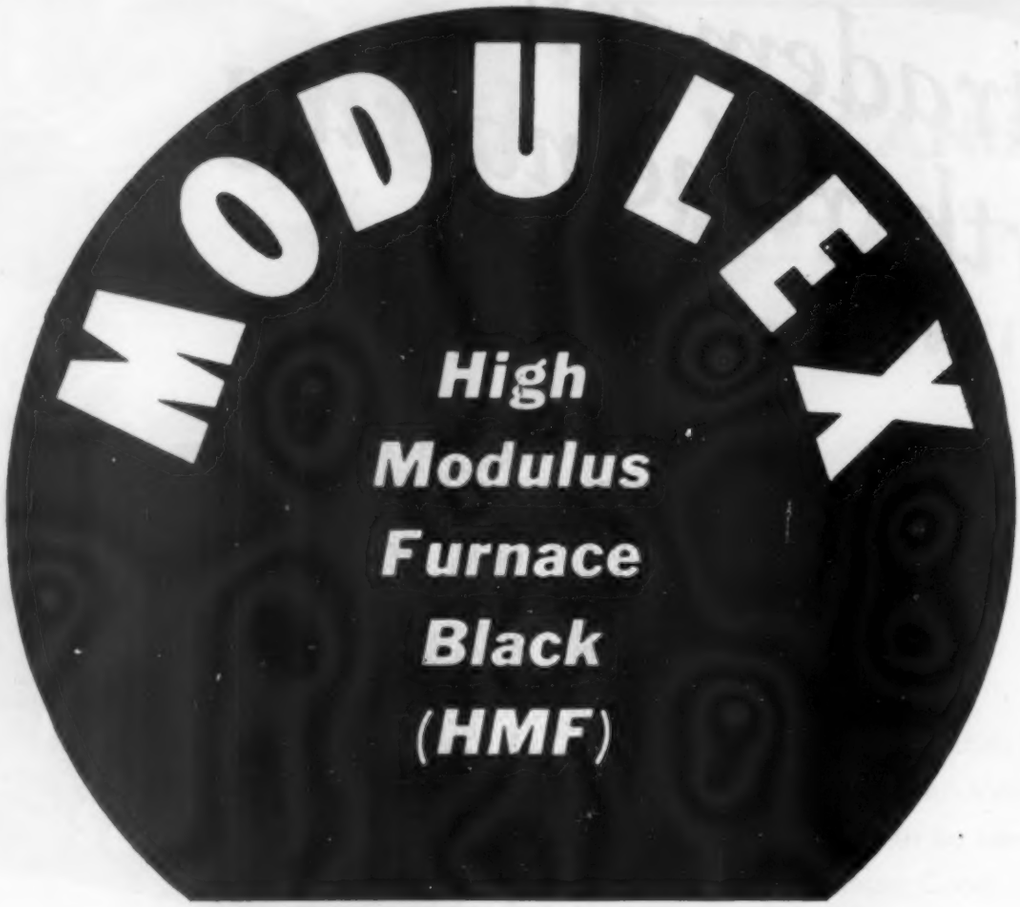

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VOLUME 60

NUMBER 3

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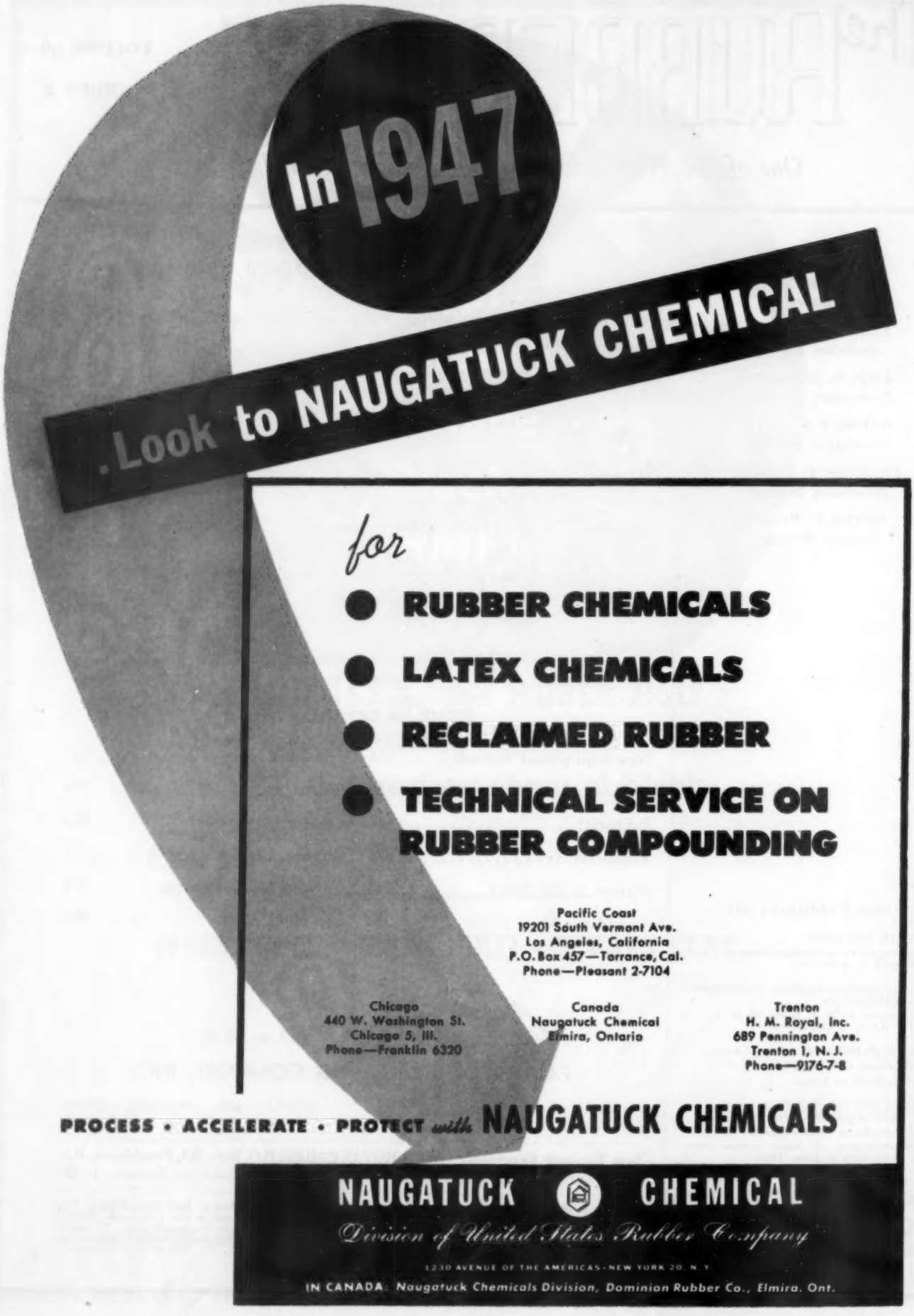
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RUBBER AGE

Vol. 60, No. 3 DECEMBER, 1946

Advances in Rubber During 1946

By ELLWOOD F. RIESING and JOSEPH O. CALLOUETTE

Firestone Industrial Products Co., Detroit, Michigan

GOVERNMENT release of natural rubber for tire manufacturing was the single most important event to the industry during the past year. On the popular small sizes of passenger car tires, only 1¼% of natural rubber was allowed in January, 1946. By November 1 this percentage was increased to 23% and for small truck sizes the amount of natural rubber has since been boosted to 67%. For truck and bus tires, as well as for airplane tires, 100% natural rubber is now permitted by the government.

In addition to these partial reconversions to natural rubber in tires, a few statistical facts illustrating the tempo of this year's tire production should prove of interest. In 1940, just prior to the war, passenger car tire production in the United States averaged 4,000,000 per month; for 1946, the monthly rate unfolds a 50% increase to almost 6,000,000 tires per month. For truck tires the 30-day output rate in 1940 was 725,000 units; this year it is averaging approximately 1,400,000 per month, representing an increase of approximately 100% *(1)*. Many refinements in tire building machinery and automatic and semi-automatic equipment have helped to accomplish this amazing production record *(2, 3)*.

It is claimed that the tires being produced now, with the increased percentages of natural rubber and the improved synthetics, along with numerous other advancements, are superior to pre-war natural rubber tires *(4)*. The improvements, other than the modified elastomers contributing to the over-all outstanding performance of current day tires, result from such as the following:

(a) New and modified forms of carbon black, so essential for reinforcing the GR-S compounds, give more efficient, cooler running carcasses, having greater resistance to tread cracking *(5-9)*.

(b) New designs for tires bring easier rides, better stability and greater safety *(10,11,12)*.

(c) New tread patterns provide longer wear and better non-skid. New materials for tire cord give stronger casings with better blow-out resistance *(13-16)*.

Improvement of the adhesion of the tire cord to the tire body is a constant development assignment in all tire plants. Much has been reported on this subject this year that is noteworthy in view of the difficulties previously encountered in obtaining adhesion to synthetic cord *(17-21)*. The tire cords which are the backbone of any tire are now being made of various and improved types of cotton, rayon, nylon and steel *(22)*.

Steel tire cords in the form of twisted small diameter steel wire cables for heavy-duty truck tires are reported to have several times the strength of textile fabric ply, and provide considerably more resistance to bruises and blow-outs. These wire cables, in addition, open up a new field for heavy duty V-belts and power transmission and conveyor belts *(23,24)*.

Note: This article is based on a presentation made by Mr. Riesing before the Rubber & Plastics Division of the American Society of Mechanical Engineers, on December 2, 1946, in New York City.

Butyl inner tube tests, conducted under desert temperature conditions operating at high speed with overloads, 24 hours per day, five days per week, showed up to be vastly superior to natural rubber inner tubes in air-holding ability *(25,26)*.

No summary of advances reported in an industry is complete without reference to the year's "biggest", whatever it may be. One company claims to have built the biggest truck tire in their forty-eight years' history, an earth-moving tire casing, 27.00 x 33 size. It has a load rating of 31,050 pounds and in itself weighs 1,627 pounds *(15)*. The biggest bomber tire in the world was built by another company measuring 110 inches in over-all diameter and 44 inches across beads. This one tire and tube weighs 2,600 pounds *(27)*.

Rubber as a resilient suspension medium for passenger cars, trucks, buses, airplanes and pullman trains has made the limelight this year. Much more should be heard on this subject within the next three to five years *(28-31)*.

Much could be written for this past year on the development of plastics by the large tire and rubber companies and the integration of the rubber and plastic industries. Finished products fabricated from unadulterated plastics, and plastic and synthetic rubber compounds of various percentage combinations, have made their appearance on the market, introduced by several of the large rubber companies. These items range from garden hose to gasoline hose, wire coverings to floor coverings, packaging materials to shoe soles, automobile to airplane parts, shower bath curtains to milady's plastic patent leather purses, shoes and belts, ice buckets to household, hotel and theatre upholstery materials, etc. *(32,33)*.

Phenolic plastic resins are reported to blend with synthetic rubbers to produce adhesives of outstanding quality *(34,35)*. It is disclosed also that phenolic resin-impregnated papers are being used in the rubber industry to take the place of reinforcing steel stampings in automotive mechanical rubber goods parts.

Research Development

"Research on synthetic rubber and latex already has reached the stage where new molecule building is almost a daily occurrence" *(36)*. Notwithstanding, additional research facilities have recently been completed by General Tire and Rubber Company and by DuPont, augmenting Akron's buildings already devoted to this work (Firestone's and Goodyear's ultra-modern research units). In addition, a new structure well under way by the B. F. Goodrich Company is scheduled for completion next year.

Besides these research centers, a vast number of universities have entered into contracts with the Office of Rubber Reserve (RFC) covering research on synthetic rubber *(37)*. Existing facilities and organizations to date are solely responsible for the high quality and versatility of present-day rubber, both natural and synthetic. However, a tremendous amount of work still remains to be done to perfect, among other needs, better plasticizers, good high temperature stabilizers, and other materials to extend rubber's usefulness *(38)*.

Rubber research chemists and physicists continue their endeavor today more ardently than ever now that the gap is narrowing between their present-day knowledge of molecular theory of the elastomers and that of actually being able to see the rubber molecule. A new lens element or pole piece is under development to improve the electron microscope. This may make possible the visual isolation of the individual molecules of synthetic and natural rubbers *(39)*. In the interim of this period of actually separating the molecules, much is being learned of molecular behavior and structure *(40)*.

We should note here that the electron microscope has enabled better evaluation of carbon black *(41)*. Research work this year on black has aided the rubber industry in processing stocks and producing vulcanizates of more excellent properties *(6,7,9,42,43)*. Since various blacks influence differently the modulus of compounds, a comprehensive investigation of the surface activity of a number of carbon blacks has been undertaken this year *(44)*. Recent reports have referred to research development of a new white reinforcing material which functions in much the same manner as does present-day carbon black by embellishing the physical properties of a vulcanizate *(45)*.

The infra-red method of examination has associated variations in molecular chain structures of elastomers with the physical properties *(46)*. Techniques with infra-red spectroscopy result in faster and more accurate solutions of research problems involving molecular structures, particle sizes, polymerization, etc. *(47)*. Particle sizes and molecular weights can also be determined now by a new means of light-scattering measurement *(48,49)*.

Investigators in some quarters this year have centered their efforts on the study of vulcanizates under tension. As a result, an apparatus has been invented to measure and correlate the tensile and electrostatic properties of rubber and GR-S at elevated temperatures *(50)*. Tension studies have also advanced the theory of correct dependence of stress upon temperature *(51)*. Tension samples at constant extension have unfolded a molecular theory to describe the permanent set taking place at elevated temperatures *(52)*. Further, under extension, strain studies have been reported on the relation of stress-time and temperature *(53)*. Also, data has been disclosed covering a new approach to the theory of tension-stress relation *(54)*.

On molecular structures of rubber-like elastic bodies, a new theory has been expounded covering the molecular reaction under deforming forces *(55)*. Large elastic deformations, as well as the effect of mechanical deformation on swelling capacity, have been explained in theory by several investigators *(56, 57)*. Also, a new approach to the theory of long range rubber-like elasticity has been set forth associating it with an entropy effect dependent on the possibility of easy rotation about single bands in giant chains of network molecules *(58)*. Much has been reported this year on physical chemistry of high polymeric systems *(59-88)*.

X-ray analysis has also continued to improve our knowledge of high polymeric elastomers. Investigation made on vulcanized and unvulcanized synthetic and natural rubbers stressed and relaxed at different temperatures have revealed much about the amorphous and crystalline structures and molecular orientation *(89-93)*.

Research work on vulcanizing agents has unfolded an entirely new class of non-sulfur halogen compounds beneficial to GR-S *(94)*. Data of far-reaching interest was presented this year on the co-efficient of friction of synthetic tire tread compounds on ice *(95)*.

Research work on the original government GR-S and on new or modified synthetic rubbers has con-

tinued throughout the year. To date, over 360 experimental polymers have been approved by the Office of Rubber Reserve and authority granted for trial production of a specified quantity of each for large scale evaluation of processing and vulcanized properties.

Incidentally, although estimated demand for GR-S for the year was set at 679,000 long tons, it was not believed that production would exceed 615,000 tons due to limited butadiene supply *(96)*. Some interesting figures on the cost of alcohol and petroleum-butadiene were published *(97)*. Disposal of synthetic rubber plants to private manufacturers continued to occupy the attention of government officials *(98)*.

Developments in Rubber

For the past century, the development of a synthetic rubber of one sort or another has been worked upon by men of all means *(99)*. The development of synthetic rubber in America extends over a period of almost 40 years *(100)*. The most striking advances were crowded into the last decade and especially during the war years just past. This is evidenced by the amazing volume of literature being released today, now that government restrictions have been lifted from most subjects.

Of the 360 experimental polymers mentioned above approximately 80 have been put into worthwhile production this year. These polymers were developed for all kinds of end products. Many of these experimental types were modifications of butadiene-styrene copolymers, resulting from the use of new emulsifiers and coagulants. But others have involved the replacement of either the butadiene with another diene such as isoprene or the replacement of the styrene with either substitute styrenes or other vinyl compounds. Descriptions of many of these appeared in the literature *(101-104)*.

One of these modified GR-S copolymers provides extremely good building tack—a property so essential for tire building *(105, 171, 172)*. The incorporation of pigments at a considerably increased rate during milling is also claimed for some of these new copolymers *(106)*. Others have provided the wire and cable covering industry with an elastomer of exceeding low water absorption *(107)*.

In extensive production are a whole new set of high heat-resistant elastomers. Some of these withstand continuous temperatures of 300° F. and endure temperatures of more than 500° F. for 8 to 10 hours. They can also be used effectively at temperatures as low as —70° F. *(108)*. There will undoubtedly be many uses for these elastomers since they too can be tailor-made *(109, 110, 168, 169, 170)*.

During the period of critical shortages of the war, the rubber industry investigated and tested various high molecular weight polymers belonging in the field of plastics. It was learned that many of these could be compounded or modified to give rubber-like elastomers. The materials performed so well in their new fields of application that the number of synthetic elastomers tripled *(111)*. The latitude between the rubber and plastics industry is growing smaller, and competition keener, with each new development *(112)*.

Processing and Testing Improvements

The work accomplished this year with electronic high frequency preheating and vulcanizing has brought forth considerable data. Reports show substantial reduction in time required for vulcanizing and more uniformity of cure throughout the finished vulcanized product, rendering improved physical properties. Greater production per unit of molding equipment by this so-called heatronic method appeals to the industry, not only for the obvious reasons but also for the effects on labor *(113-115)*. The method makes possible the uniform vulcanization of rubber parts of extremely heavy sections, in a fraction of the time consumed by the conventional platen press.

Forward strides have been reported during the past 12 months in transfer and injection molding. Both accomplish the production of mechanical rubber goods of superior physical properties along with a reduction in curing time cycles. These molding methods also make possible a higher degree of accuracy for precision parts having rubber-to-metal adhesion inserts *(116-119)*.

A contest held under the auspices of the Chicago Rubber Group on "The Utilization of Cured Synthetic Scrap" brought forth many interesting methods, some of which have been published this year. The Lancaster-Banbury method of devulcanizing mixed synthetic and rubber scrap is claimed to produce at reasonable cost a reclaim with properties comparable to those obtained by the more elaborate conventional methods of today *(120)*. Since, in the past few years, we have produced little else but GR-S, it has been predicted that our supply of natural rubber scrap will diminish rapidly and that in two years a preponderance of reclaim will necessarily be GR-S. Therefore, the urgency of solving this problem is apparent, as reclaim plays an important part in our national economy *(121)*.

Many thoughts have turned to the reclaiming of scrap, mixed and sorted, and an economical procedure is reported for dealing with this scrap by using effective reclaiming oils or organic liquids *(122-125)*. It has also been disclosed that success has been achieved in the utilization of cured synthetics as scrap *(126)*.

New innovations in continuous Buna S preparation and continuous coagulation of Hevea latex have been reported *(127, 128)*. Hevea latex storage over long periods of time had not been investigated before the war. Data disclosed on preservation methods proves that natural rubber latex can be successfully stored for more than four years *(129)*.

Data has also been published on the recommended GR-S and natural rubber ratios that result in abnormally high modulus values *(130)*. For the first time since the end of the war, a comprehensive set of wartime rubber production figures has been released *(131)*.

An avalanche of new laboratory and factory production quality testing methods appeared in this year's literature. Methods and measurements of hysteresis in rubber-like materials have been disclosed *(132)*. A new laboratory test method is reported for measuring the low temperature stiffening of various elastomers *(133)* and also an improvement in apparatus for low temperature brittle point determination *(134)*. Another laboratory technique employing temperatures from —50° to 200° C. has been perfected to demonstrate the effect of gaseous environment on dielectric strength, and more specifically, to evaluate the role of oxygen as a fundamental factor in dielectric failure on synthetic and natural rubbers *(108)*. A separate evaluation method of the effective temperature and of oxygen concentration has been accomplished by comparing the results of both air-oven and bomb-aging at each of two temperatures, —80° and 100° C. *(135)*.

It is a recognized and accepted fact that there is no correlation between durometer hardness and static compression modulus of vulcanization. A real need, therefore, existed for years, to enable rapid checking of modulus on production parts, such as automobile engine mountings. A factory device has been developed claiming to accomplish this *(136)*.

A variety of new tests for diverse products made of natural and synthetic elastomers, developed by the U. S. Navy, has been published. Many of these tests are applicable to general line items *(137)*.

Laboratory methods of setting up accelerated weathering with ultra-violet radiation and dynamic flexing of elastomers are constantly being devised as the art of rubber processing advances *(138, 139)*. The advantages of waxes in retarding weathering have been correlated on a new stretching type test machine *(140)*.

New techniques with a compression plastometer are possible and information about the rheological properties that are commonly obtained with a compression plastometer can be supplemented if a few additional readings and calculations are made *(141, 142)*. Details of a puncture-tear tester for rubber-like materials have also been made available *(143)*.

Laboratory testing methods for a quantitative measuring of the state of cure can be performed by using a slight modification of the ASTM method "B"— Standard No. D-395-40T *(144)*.

It has been concluded that the state of cure of neoprene vulcanizates can be determined by the rate of recovery of "racked" samples *(145)*.

A microscopic technique has been disclosed which permits visual observation of structural changes of natural and synthetic rubbers during mastication and their subsequent recovery *(146)*.

Of value to production departments is a new method made available for cleaning vulcanizing molds. Use is made of a soft grit obtained by grinding up corn cobs. This grit, when blasted under air pressure against the molding surfaces, does a thorough cleansing job without any injury to the molds *(147)*.

Developments in Compounding Ingredients

The report this year of the discovery of an entirely new class of non-sulfur vulcanizing agents for the butadiene-styrene copolymers has been of tremendous interest to the rubber industry's compounding chemists. This new class consists of halogenated compounds which may be divided into three types: (1) Halogenated aliphatic hydrocarbons containing at least one $-CX_3$ group, where X represents chlorine, bromine, or iodine; (2) Halogenated aryl methyl compounds containing at least one halogen in the methyl group; (3) Aliphatic compounds containing a $-CX_3$ group and another reactive group, such as ethyl trichloroacetate. Each of these types behaves somewhat differently with respect to activation by metal oxides and other substances, but all will give vulcanizates having high moduli and good tensiles. The vulcanizing agents of the second type are of particular interest since by their use vulcanizates of unusual aging properties can be produced. These vulcanizates show no increase in moduli or decrease in elongations on 1-2 day 100° C. oven aging, and sometimes even show reversion on aging, which is a very unusual phenomenon for GR-S *(94)*.

Other non-sulfur vulcanizing agents designed expressly for use with some of the newly modified GR-S copolymers are now available. In general all of these agents impart faster curing rates than does sulfur *(148)*. However, some actually enhance the physical properties of the finished product by lowering the hysteresis index and bettering the heat stability characteristics *(105)*. Light-colored and white GR-S stocks show great increase in tensile when compounded with triethanolamine.

Much has been recorded over the past 12 months to improve the physical properties of stocks of natural and synthetic polymers through the use of new compounding ingredients and methods *(149)*. The study of structural changes resulting from milling and subsequent recovery has been reported explaining variations in factory batches *(146, 150-154)*.

Compounding variables that influence tensile strength in vulcanized rubber and the problem "Why is one rubber stronger than another?" have been reported and the factors which affect this property, such as polymer chain length relation and molecular weight, have also been revealed *(155)*.

The use of certain activators with pure GR-S stocks is claimed to increase the tensile value and promote better aging resistance *(156)*. GR-S stocks with improved characteristics for wire and cable extruded coverings are affected by compounding with various mineral pigments *(88)*.

Carbon blacks, the mainstay reinforcement for synthetic and natural rubbers, have been improved and further studied this year to aid compounders in their problems of mixing stocks and bettering the vulcanized properties *(9, 43)*. The important work on blacks can briefly be summarized as follows: The resultant effect of pelletization *(7)*; the effect of variable quantities of black and softeners *(6)*; the aiding of black dispersion *(42)*; the influence of acetylene black on the electrical properties of GR-S *(157)*.

In the past, rubber compounders have desired a reinforcing agent for light-colored and white stocks that functioned as well as carbon black does for black stocks. Two announcements were made this year that should, therefore, prove to be of both interest and value. One is a light soot called "White Carbon Black," produced by the combustion of ethyl silicate *(45)*. The other is a superfine silicon dioxide produced by the combustion of silicon tetrachloride *(158)*.

Noteworthy also to the compounders is the work reported on the following: The use of alkyl phenolic resins as tackifiers *(159)*; the use of styrene-diene resins *(160)*; plasticizing with various active chemicals *(161)*; influence of polar compounds (glycols) on hydrated calcium silicate and GR-S vulcanizates *(162)*.

Some fundamental studies on the oxidation of GR-S, as well as other elastomers, is revealed and alkaline materials as accelerators for GR-S are compared in order to determine the effect of more strongly alkaline materials, finally promoting vulcanization of GR-S at room temperature *(43, 163)*.

Also reported in the literature is the work done on the simultaneous incorporation of pigments and plasticizers in the form of pre-mixed preparations *(164)*. This incorporation is based upon the ratio of the materials used in such pre-mixed preparations and is the deciding factor in their usefulness. For each filler there is a fixed ratio.

Considerable work has also been reported this year on compounding of latex *(165)*. Work has been done on black and non-black pigments in dispersions for compounding *(166)*. Lignin is being used as a rein-

forcing agent with effective results when incorporated in latex by the masterbatching procedure. GR-S shows very outstanding properties for tensile strength and tear resistance when so compounded *(167)*.

It is claimed that Buna N latex is finding use in reinforcing a variety of fibrous materials.

Summary

The conclusion for a year's summary paper such as this should not bear on the work reported during this past year but should list next year's "needs" or "wants" of both the rubber manufacturers and the rubber users. Paramount under the heading of "wants" is a definite national policy from the government on synthetic and natural rubber. Under "needs" the classic problem of the chemical reaction of vulcanization remains to be solved in order to open up new avenues in compounding approach.

Next in importance in the authors' opinion is the "need" for a method of reducing to a minimum the Joule effect on vulcanized elastomers, or a means of compensating for it mechanically in various products. Also "needed" is a synthetic rubber having extremely high efficiency along with a degree of oil resistance surpassing that of any of the present day so-called oil resisting elastomers that either swell or shrink excessively and are high in hysteresis index.

Further required by the rubber manufacturers is a class of vulcanizing agents that will produce optimum cure to stocks of natural and synthetic rubber blends.

It is the authors' prediction that some of these "needs" and "wants" will become a reality before the end of 1947.

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A new **electronic interval timer** suitable for all applications requiring highly accurate circuit timing has been developed by Electronic Controls, Inc., 44 Summer Ave., Newark, N. J. Time range is from 1 to 120 seconds in increments of one second and accuracy is said to be better than 5%.

Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass., has introduced two **photoelectric controls** which are said to be rugged and efficient high speed units designed for general industrial and machinery application. The controls are recommended by the company for such applications as counting, conveyor control, short range signal systems and motor or valve control.

C. J. Tagliabue Division, Portable Products Corp., Brooklyn 6, N. Y., has added a **fully automatic recorder-controller** for pressure and temperature to its line. The new instrument requires only the push of a button to control processing completely from start to finish. A red light glows on the controller during the entire steam-heating phase of the process, and changes to white when heating has been completed and steam is shut off.

A new type of tension or weight measuring instrument, called the **Tens-O-Trol Remote Indicating Dynamometer,** has been introduced by W. C. Dillon & Co., Inc., 5410 W. Harrison St., Chicago 44, Ill. With the use of this new device remote repeater stations may be as far as 300 feet from the actual measuring dynamometer.

An entirely new line of **semi-skids and jacks** has been introduced by the Market Forge Co., Everett, Mass. The unit, made entirely of steel with a high tensile steel deck, is available with wheels of semi-steel, plastic, cushion rubber and aluminum.

A Colorimetric Method for Evaluating Dispersing Agents

By GIULIANA C. TESORO, WILLIAM T. DONAHUE and JOHN A. CASEY

Research Laboratories, Onyx Oil & Chemical Co., Jersey City 2, N. J.

DURING recent months the authors of this paper found it necessary to evaluate the dispersing properties of commercially prepared products which come under the general classification of sulfonated di-aryl methane compounds. Dispersing agents of this type are not, strictly speaking, surface active. They have no appreciable effect on surface tension, and, therefore, utilizing their surface active properties as an indication of their dispersing power was not possible. To the best of our knowledge, no information is available in the literature on the laboratory testing of non-surface active dispersing agents. It therefore became imperative to devise some testing procedure.

Since the type of compound under consideration finds frequent use as a dispersing agent for pigments in various commercial practices, it followed logically that the ideal laboratory evaluation should be based on this application. The selection of a suitable pigment was the next problem facing the authors. Various inquiries among well-qualified representatives of the trade brought information to the effect that DuPont's Hansa Yellow YT 445D would be the ideal test material. It was described as a pigment which was unaffected by contact with water and one which is very difficult to disperse. It was felt that any compound which efficiently dispersed this pigment, therefore, would be even more efficient with pigments more easily dispersed. Accordingly, the authors adopted the Hansa Yellow pigment as the logical test substance.

The next step in the process of developing a suitable testing procedure was the authors' decision to attempt to utilize the photoelectric colorimeter as the measuring device of the dispersing efficiency. It was planned to stir together the pigment and a solution of dispersant by some mechanical means and obtain the colorimetric value on the resulting dispersion. Various methods of stirring were tried but without success since no reasonable duplications of color value could be secured. It appeared likely that stirring was impractical due to the poor wetting characteristics of the pigment. The latter rode on top of the liquid even while the agitation was going on. The next type of agitation tried was shaking a mixture of pigment and dispersant solution. The results obtained by this method were no better than those obtained by stirring.

The inability of the authors to obtain reasonable duplications of results made it quite evident that a different type of agitation would be necessary to bring the pigment and dispersing agent into the proper intimate contact. It was therefore decided to try a type of mixing similar to the action of a ball mill. Accordingly, a rotating shaft device (based on the Launderometer principle) capable of holding four pint-size containers was put into service for this purpose. The balance of the equipment consisted in friction-top metal cans and ¼-in steel balls. Duplication of results was easier to obtain when new cans were used for each run.

Preparation of the Dispersion

A 1.25 g. sample of the dispersing agent was weighed on the analytical balance and transferred to one of the cans containing 36.25 g. of water. (If the material was not 100% active enough material was taken to give 1.25 g. of active material and the water was reduced so that the total weight of the sample and water was 37.50 g.). The sample was dissolved in water by gently agitating the can. Fifty ¼-inch steel balls were then added to the can in such a manner as to avoid splashing. Twenty-five grams of the pigment, weighed accurately on a Harvard balance, were put into the can and the top was tightly closed. The can was placed in the machine and rotated for exactly 2 hours at 55 r.p.m. At the end of this time the machine was stopped, the cans were removed and their contents poured into jars capable of being tightly capped. No attempt was made to transfer the contents quantitatively, and scraping of the container was avoided. If the pouring was carefully done the balls remained in the can.

The authors observed that efficient dispersing agents effected the formation of smooth liquid dispersions, whereas the poorer type yielded dry looking lumpy pastes. No froth or foam formation was observed when sulfonated diaryl methanes were used in the preparation of the dispersion.

Testing of the Dispersion

One gram of the dispersion was quickly weighed into a small beaker on the analytical balance. It was transferred with the aid of water and a rubber policeman to

TABLE I—COMPARATIVE DISPERSING POWER OF SEVEN DIFFERENT SULFONATED DIARYL METHANES

Sample	Run I		Run II		Run III	
	Unfiltered	Filtered	Unfiltered	Filtered	Unfiltered	Filtered
A	240	196	252	215	242	194
D	246	195	260	228	256	222
E	242	186	256	185	...	...
F	244	206	254	220	...	...
G	242	204	252	201	244	204
H	248	202	257	204	258	201
I	215	142	221	133	222	145

a 250 cc. volumetric flask, and made up to volume with cold tap water. After the dispersion was thoroughly mixed, a 25 cc. aliquot was transferred to a one-liter volumetric flask and made up to volume with tap water. The depth of color of this solution, both before and after filtering through a folded filter paper (Whatman No. 12), was then estimated on the Klett-Summerson photo-electric colorimeter using the green filter (Filter No. 54). Results obtained by this method with different dispersing agents are summarized in Table I. Runs I, II and III represent entirely different runs, the colorimeter readings being obtained on diluted samples of different dispersions.

It will be apparent from Table I that the largest deviations between different runs on the same dispersants are of the order of 6% for the unfiltered solutions (246 and 260 for sample D; 242 and 256 for sample E). For the filtered solutions, the agreement between checks is about the same, with the exception of one reading (195 for sample D) which is very far off.

From the colorimetric readings, conclusions may be easily drawn regarding the efficiency of the dispersing agents. It becomes apparent, for instance, that Sample I is much inferior to all others as a dispersing agent. Samples A, D, E, F, G, H, have similar dispersing power, with Sample E appearing slightly inferior from the colorimetric readings on filtered samples.

When 25 g. of the Hansa Yellow pigment were "dispersed" in 37.50 g. of water in absence of a dispersing agent, using the method described, a pasty, lumpy dispersion was obtained. Testing of this dispersion gave colorimetric readings of 44 and 25 for the unfiltered and filtered solutions respectively. This experiment indicated that only a small part of the total dispersing action is due to the mechanical factors involved.

Summary

A method for the evaluation of non-surface active dispersing agents involves the preparation of a pigment dispersion, and the determination of dispersing power by the use of the photo-electric colorimeter. Evaluation of a large number of dispersing agents by this method indicates that satisfactory agreement between duplicate runs can be obtained by proper control of the experimental conditions.

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Hydromite—A New Cement-Resin Combination for Casting

A NEW easily formed, quick-hardening die material, which is said to combine the advantages of synthetic casting resins and gypsum cements, has been developed by the United States Gypsum Co., 300 West Adams St., Chicago 6, Ill. Known as Hydromite, it is a dry powder which requires only the addition of the proper amount of water. The major advantages claimed for this new material are that it is easy and quick to mold and cast, has less shrinkage than synthetic resins, casts and forms in simple molds and dies, and has more permanently stable dimensions than most plastics. It is said to be superior to gypsum cements in toughness, impact strength, surface hardness, and resistance to abrasion, and to be particularly advantageous for detailed dies with abrupt contour changes because the strength and hardness of the material keep the edges from wearing.

Hydromite was first released in experimental quantities about a year ago, and since has found many commercial applications. An interesting use of the material is for the shell over rubber latex molds, which backs up the mold in the proper position and keeps the dimensions accurate and permits rough handling of the mold when removing entrapped air and surface bubbles. Not only is Hydromite used for the shell, but also in the formation of the rubber latex strip molds themselves.

Mixture Recommended by Manufacturer

In mixing Hydromite, 100 parts of the material to 16 to 17 parts of water, each by weight, is recommended by the company to obtain accurate and consistent results. If a mix is desired for greater strength and hardness, the water content may be reduced to 13 or 14 parts. The resin material should be added to the water and immediately mixed, preferably with a confectioner's wire whip.

In order to insure a good reproduction and avoid trapped air, a small quantity of mix is poured into the mold and forced into the detail by rubbing or brushing. A mold dressing or wetting agent, used according to the manufacturer's direction, leaves a wet film on the mold face and permits complete filling of detail with minimum brushing and vibration. The mold dressing breaks the surface tension of the water in the plaster. Dreft is one of the more common materials which can be used for this purpose.

Develops Strength in Two Stages

Hydromite is said to develop strength in two stages. During the first ten to fifteen minutes it retains its syrupy consistency. This is followed by a twenty to thirty-minute hardening period, during which it develops sufficient strength to permit separation from the mold or model. It heats and expands slightly while this hardening occurs, and separation is easier if made during this period of maximum heat and expansion.

The "hardening" is followed by a "curing period." The curing varies with the size of the cast and the curing temperatures, which never should exceed 150° F. When temperatures of 150° F. are exceeded, the product is weakened. Hydromite may be poured or injected with air pressure, but it can not be screeded. It can be cast into any synthetic rubber or plastics mold, but glue molds can not be used because they are destroyed by the heat which Hydromite gives off in curing.

DuPont's New Akron Rubber Laboratory

A COMPLETELY modern, fully-equipped laboratory, designed particularly to be of service to the rubber manufacturing industry of the middle west, has been established by the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., in Akron, Ohio. The new two-story brick building, which was formally opened on November 22, is located at 40 East Buchtel Avenue, at High Street. Approximately 48 by 90 feet in size, it contains a series of laboratories for experimental work with both natural and synthetic rubbers.

The facilities of the new Akron laboratory include a separate, fully air-conditioned latex laboratory, an extensive mill room, a separate weigh-up room, a curing room, an oven room, and an air-conditioned testing room. The offices and a large conference room, all tastefully decorated and equipped with modern furniture, are located on the second floor. Most of the laboratory and testing rooms are also located on this floor, with the mill room and curing room, as well as a special testing room, located downstairs. All of the rooms feature fluorescent lighting, and bench tops throughout are of stainless steel.

Latex Laboratory is Feature

The latex laboratory is the pride of the Akron setup. Fully air-conditioned, this laboratory is equipped to handle practically all phases of experimental work on the use of natural and synthetic latices. Modern throughout, it has constant temperature and humidity control, ample enclosed storage space, and slate-topped work surfaces running the full length of the room along both sides.

A feature of the laboratory is an automatic dipping machine for simulating plant production of gloves, balloons, bathing caps, and other articles from latex. Designed and built by the company's engineering department, its cycle can be varied to match actual factory practices and it can, in fact, be used if desired for small scale production of latex products.

This machine, built of stainless steel and operated by a variable speed motor, has three tanks, one for the latex compound, another for coagulation of the dipped film, and the third for leaching with water. In operation, it first lowers and raises forms, on which the latex is deposited, in and out of the latex compound tank at a uniform speed to avoid uneven deposits of the rubber. After the dipping operation, the coated forms are moved on the machine and lowered into the coagulant, where the deposit is set, and finally into a constant temperature water bath where salts and other undesirable impurities are leached from the film. Following these operations, the article is dried and then cured in ovens.

The latex laboratory also contains equipment for the production of latex foam sponge. A Hobart 20-quart mixer is used for frothing the latex. This mixer works like that commonly used in the home to whip eggs or cake batter. It froths the latex to eight or ten times its original volume by whipping air into it. During this whipping operation compounding ingredients are added to cure the sponge and impart special properties to it. When the latex is frothed sufficiently, special gelling agents are added so that on pouring it into molds the froth sets up as a gel. This gel is then cured, usually in steam ovens, and finally removed from the mold and dried. Small molds are on hand, simulating small cushion construction, so that adequate testing on finished products can be suitably performed.

Among other pieces of equipment in the latex laboratory is a constant pressure device for testing adhesion, as well as ball mills, colloid mills and mixers for the preparation of finely divided dispersions and emulsions essential to the compounding of latex. There are also special instruments for determining various properties of latex, such as viscosity, alkalinity, surface tension,

View of the latex laboratory in DuPont's new laboratory in Akron. The Semi-automatic dipping machine can be seen in the left background. The Hobart mixer used for frothing latex can be seen on the right.

particle size, etc., which are important in controlling the behavior of latex in manufacturing processes.

The adhesion testing device is actually a miniature press, consisting of an air bag contained in a steel shell operating against a reinforced metal plate. Its effective area is 8 inches by 10 inches. One of the more interesting features of the press is the air bag itself, which was dipped from a very low modulus neoprene latex stock so as to minimize the energy loss in overcoming the initial resistance of the elastomer to distortion. This assures that the recorded pressure is, actually, the force being exerted on the sample. Air to fill and exhaust the bag is controlled by a three-way, push-pull valve which allows instantaneous application and removal of pressure. A second manually-operated valve regulates the air pressure to any desired value between 0 and 50 pounds. The press is also equipped with a safety device which makes it impossible to admit air to the bag while the lid is open or to open the press while there is still pressure on the bag. The use of the press fills a real need in insuring uniform pressure being applied to adhesion samples. The reproducibility of adhesion test results are, therefore, greatly improved.

Among the specific pieces of apparatus in the latex laboratory are the following: Manton-Gaulin colloid mill, Waring blendor, Fisher titrometer, Christian Becker "Chainomatic" weigh scale, Fisher "Airtemp" heater, Barnstead still, Toledo batch scales, Federal measuring gauge (for film thickness), Cenco-DuNouy tensiometer, Beckman pH meters, and a Stormer viscosimeter.

Apparatus in the Testing Room

The air-conditioned testing room contains all of the equipment ordinarily used in evaluating rubber and rubber-like articles, with facilities for low and high temperature testing, measurements of abrasion resistance, heat build-up, flex-growth or cut-growth resistance, etc.

Specific equipment in the testing room includes a Scott tensile tester, which measures the strength of any given rubber compound as well as recording elongation and stress of any given elongation, and which is equipped with a special hot jacket which can be set for any temperature up to about 100° C.; an American Instrument sub-zero freeze box for testing rubber products at extremely low temperatures; a Goodrich flexometer for measuring the heat build-up of rubber compounds during flexing; a DeMattia flexing unit for measuring the growth of a cut; both a DuPont abrader and a Bureau of Standards abrader for measuring abrasion resistance; and a Mooney viscometer for determining relative plasticity or viscosity of rubber compounds.

Facilities are also provided for testing finished rubber goods under conditions simulating actual service conditions. For example, a special device is being used to determine the operating characteristics of solid industrial truck tires. This special equipment consists of a level steel track along which a standard wheel, six inches in diameter with a tread 1¾ inches wide, is drawn by means of a steel tape and a motor-driven winch. During the test, a loaded wheel is pulled along the track at a given rate. The force required to start the wheel rolling and that required to keep it moving is measured on a spring balance linked by means of a tape to the wheel and the winch. An autographic chart, connected to the balance arm and the wheel carriage, makes a continuous record of the spring balance reading during the entire distance of travel.

The testing room also contains equipment for testing the effects of ozone in high concentrations on products designed for use under these conditions. Many small devices for measuring many other properties of rubber compounds, such as resilience and compression set, are also to be found in this room, including the Bashore resiliometer, American Instrument permanent set unit (A.S.T.M., Method A), hammer-type standard jig freeze test unit, and a Scott Mooney plastometer. A U.S.M.C. clicking machine, for the accurate preparation of test specimens, is also in the testing room. In passing, it is interesting to report that both the DuPont and Bureau of Standards abrading machines located in the room are hooked up with a vacuum cleaner arrangement to keep them clean at all times.

Mill and Other Rooms

The mill room at the new Akron laboratory, which

Interior view of the test room, showing the clicking machine, Scott Tensile Tester, Jolly balance, low temperature refrigerator, and Goodrich Flexometer.

is not quite complete at this writing, will eventually contain all of the equipment normally found in factory-size mill rooms. This equipment will include a laboratory size Banbury, two Stewart Bolling mills (one 10-inch and the other 16-inch), a Stewart-Bolling 20-inch calender, and a Royle tuber. The latter, already installed, is equipped for steam or water operation, or a mixture of both, with an electric heating unit located on the die itself.

The curing room, which is separated from the working space of the mill room, contains two 24-inch National-Erie presses and a Biggs Boiler open steam vulcanizer, all equipped with Taylor recorders. The hydraulic presses are operated by remote control from outside an enclosing wall. The automatic temperature recorders, gauges and valves are mounted on the outside panel, and sliding doors allow access to the press platens. This arrangement not only makes for better working conditions, but insures a uniform atmospheric temperature surrounding the curing presses. The curing room is also equipped with a special blower.

The oven room for accelerated aging tests is equipped with three large and one small Precision oven, also equipped with Taylor recorders. A Precision temperature bath is also located in this room, which contains both a hood blower and a room blower, each operated independently of the other.

The weigh-up room, which is an independent unit of its own, and which is located directly off the mill room, features over one hundred large and small compound drawers, many of them equipped with special pull-out devices, and so constructed that little spillage of contents can result. Toledo batch scales are used.

Some other interesting facts on the new laboratory include the following: Each piece of functioning apparatus in the laboratory is separately controlled, the control room being located in the basement. An adequate machine shop is maintained on the first floor of the building so that small-sized special pieces of equipment can be constructed on the premises. Special racks are provided in various rooms for sheet compounds, which are first placed on stainless steel plates. Although distribution of DuPont rubber chemicals and compounding ingredients is not the function of the laboratory, a small supply of some materials will be maintained for emergency use by the company's customers.

Exterior view of the curing room, in which is located two steam-heated platen presses and an autoclave. The presses are operated by remote control from the outside.

The weigh-up room contains over one hundred large and small drawers for storing compounding materials. A Toledo batch scale is used for preparing amounts.

Personnel of the Laboratory

All of the executives manning the new laboratory are well-grounded in rubber experience and all of them are well-known to the rubber industry. Supervision of the laboratory is in the capable hands of Harry A. Hoffman, who is manager of the Akron Branch of the DuPont Rubber Chemicals Division. Dr. Charles J. Mighton will manage the laboratory, while Embert L. Stangor will be in charge of compounding and Thurman M. Taylor in charge of processing. Ralph B. Appleby will handle technical sales, and Mrs. Irene Scott Farr will supervise the clerical staff. Biographies of all of these executives follow herewith:

HARRY A. HOFFMAN: Mr. Hoffman, manager of the Akron Branch, has represented the Rubber Chemicals Division of the DuPont Company in the Ohio district since 1931. Prior to this he had spent many years in the technical end of the rubber industry. He was born in Indianapolis and was graduated from a technical high school in that city. He attended Indiana University at Bloomington, majoring in chemistry.

Starting in 1907, Mr. Hoffman's first job was as a chemist for Eli Lilly and Company, in Indianapolis. In 1910, he went to Akron and took a position on the technical staff of the B. F. Goodrich Company. His service at Goodrich extended over 18 years. From 1917 to 1925 he was development manager, directing a group doing development work on tires, golf balls, hard rubber, and specialty goods. During the same period he was directing the work of another group following the quality control on regularly used chemicals and raw materials and developing uses for new ones. After a reorganization in 1925, this group was set up as a separate unit and became the Raw Materials Control and Development Department. From 1925 to 1928 he devoted his entire time to the management of this department.

After leaving Goodrich, Mr. Hoffman joined the Mason Tire and Rubber Company of Kent, Ohio, and was chief chemist for two years. Late in 1930 he joined the Roessler & Hasslacher Chemical Company, work-

Harry A. Hoffman
Manager, Akron Branch

Dr. C. J. Mighton
Laboratory Manager

E. L. Stangor
Compounding

ing in the Great Lakes area as technical representative on rubber chemicals. It was through this company that he became associated with the DuPont Rubber Chemicals Division. In 1931, there was a consolidation of their activities on rubber chemicals. He became manager of DuPont's Akron branch in 1945.

Mr. Hoffman is a member of the Phi Kappa Psi fraternity, the American Chemical Society, and the Portage Country Club of Akron. He is married and resides at 1940 Stockbridge Road, Akron.

DR. CHARLES J. MIGHTON: Dr. Mighton will manage the new Akron Laboratories and give particular attention to problems pertaining to natural or synthetic rubber latices. Prior to joining DuPont's Rubber Chemicals Division, he was research supervisor at the company's Experimental Station in Wilmington, Del., directing various phases of synthetic rubber research.

After obtaining his master's degree at the University of Saskatchewan, Canada, Dr. Mighton received a Ph.D. in organic chemistry in 1937 from the University of Chicago and was employed in the same year by the Chemical Department at DuPont's Experimental Station. For five years, he carried out research in the polymerization field, emphasizing studies for the Rubber Chemicals Division on the development of improved neoprenes as well as the butadiene rubbers. He was appointed research supervisor in 1942 and continued in this capacity until 1945.

His work during this period was concerned particularly with synthetic rubbers and included fundamental studies of neoprene, development of improved latex tire cord adhesives, chemicals for use in the manufacture and processing of synthetic rubbers, and reclaiming agents. During the war, Dr. Mighton also supervised research sponsored by the Office of Scientific Research and Development. He has taken out numerous patents on synthetic rubber, plastics, adhesives and coating compositions.

Dr. Mighton joined the Rubber Chemicals Division

R. B. Appleby
Technical Sales

Irene S. Farr
Office Manager

T. M. Taylor
Processing

in 1945 at their Chambers Works Laboratory, Deepwater Point, New Jersey, and since then has devoted major attention to the industrial applications of neoprene latex. He was transferred to his present position as Laboratory Manager in Akron in June, 1946. He is a member of Gamma Alpha and Sigma Xi scientific societies, and the American Chemical Society, is married and has two sons.

EMBERT L. STANGOR: Mr. Stangor will be in charge of the compounding of dry rubber, neoprene, and other synthetic rubbers in the new laboratory. In addition to the compounding of dry polymers, the physical testing of rubber compounds will be directly under his supervision.

Immediately after graduating from Beloit College in 1940 with a bachelor of science degree in chemistry, Mr. Stangor joined the laboratory staff of the Featheredge Rubber Company in Chicago. Here he gained experience in the rubber industry, working specifically on problems pertaining to the compounding of rubber for the manufacture of chemically blown sponge.

During the war years, 1942-1945, Mr. Stangor was employed by the Chicago Belting Company and worked on the compounding, processing and finishing problems connected with the manufacture of synthetic rubber molded articles required by the Army and Navy Air Forces.

In June of 1945 he joined the staff of the DuPont Rubber Laboratory at the Chambers Works, Deepwater Point, New Jersey, and, until his transfer to the new Akron Laboratory, had been engaged there in development and research.

THURMAN M. TAYLOR: Formerly processing supervisor of the DuPont Rubber Laboratory, Deepwater Point, New Jersey, Mr. Taylor has been transferred to the Akron Branch to assume similar duties. He will serve the industry on processing problems involving natural and synthetic rubbers, and will have charge of the laboratory's mill and curing rooms. He has had 34 years' experience in production work.

After six years with the Miller Rubber Company, Mr. Taylor joined the B. F. Goodrich Company in Akron in 1918, starting as recipe clerk and advancing to assistant processing superintendent. He was transferred, in 1937, to supervising processing work on tires and tubes at the Goodrich plant in Oaks, Pennsylvania. In 1940 he went with the Electric Hose & Rubber Company, Wilmington, Delaware, to supervise processing and tubing operations on hose of all types, and in 1945 was employed at DuPont's Rubber Laboratory in New Jersey. He is married and has three children.

RALPH B. APPLEBY: Mr. Appleby is technical sales representative for the DuPont Rubber Chemicals Division in the Akron Branch, serving accounts in Ohio, Pennsylvania and Kentucky. He attended Drury College in Springfield, Missouri, graduating in 1923 with an A. B. degree in chemistry. He received his master's degree in 1925 at the University of Missouri.

In 1925 Mr. Appleby started in the general chemistry laboratory of the B. F. Goodrich Company, moving into the tire division as compounder in 1926. Then came two years, 1927 to 1929, in technical service and sales on rubber chemicals for the American Cyanamid Company. He did technical service and sales development work for the Thermatomic Carbon Company in 1930 and 1931, going back to the American Cyanamid Company in 1932 for general sales in Ohio, becoming district manager in 1932.

Mr. Appleby joined DuPont in 1937 as salesman for the Cleveland district for the Electrochemicals Department, becoming supervisor of priorities in the Cleveland office in 1942. He was transferred to the Akron district as salesman for the Rubber Chemicals Division in 1945.

He is a member of Phi Alpha Sigma, Alpha Chi Sigma, Gamma Alpha fraternities, and of the Akron University Club, is married and has a married daughter and two sons. He resides at 615 Morely Avenue, Akron.

IRENE SCOTT FARR: Mrs. Farr, often called Miss Scott, is in charge of the clerical staff and general office activities of DuPont's Akron Branch.

Mrs. Farr joined the Rubber Chemicals Division of DuPont in 1944 after serving for two years with the Office of the Rubber Director in Washington, where she had wide contacts with the rubber industry in the allocation of natural and synthetic rubber. She was previously employed by the U. S. Rubber Company in their Detroit and New York offices.

Mrs. Farr is a member of Beta Sigma Phi, international business girls' club, and has had considerable experience in statistical studies involving the rubber industry.

Livingstone & Co., 89 Broad St., Boston, Mass., has introduced a new and unique boiler which utilizes electricity to generate steam for pressures up to 200 pounds per square inch and in volume up to two boiler horsepower. Called the *Livingstone Speedyelectric Steam Boiler*, it is recommended by the company for use in plastics molding, tire recapping, and laboratory installations.

A fork truck, known as the *Automatic Sky Lift*, which is said to feature the highest lift ever achieved on that type of vehicle of standard 83-inch collapsed height, is being produced by the Automatic Transportation Co., 149 West 87th St., Chicago 20, Ill. The truck's lift of 130 inches is reported to be 10 inches higher than any other hydraulic truck.

A *No. 8 Mikro-Atomizer*, which is said to be capable of producing ultra fine powders in the range of 1 to 25 microns in size (325 mesh) in large production quantities, is being manufactured by the Pulverizing Machinery Co., 52 Chatham Road, Summit, N. J. Using a 75 h.p. motor, this new mechanical screenless pulverizer is reported particularly applicable to tonnage operations, ranging from 2000 to 8000 pounds per hour.

Development of a new type of *all-steel skid platform* for use with hand and electric lift trucks has been announced by the Market Forge Co., Everett, Mass. The load carrying surface, made of medium gauge high tensile strength steel deck panels, is reported desirable for handling sheets of rubber, leather, and paper.

Panel Discussion on PROCESSING OF NATURAL AND SYNTHETIC RUBBER

Sponsored by New York Rubber Group at Its Meeting on October 18, 1946

PREFACE

Timeliness was the keynote behind the selection of the subject agreed on by the Program Committee of the New York Rubber Group for its meeting of October 18, 1946. It was felt that there was a great deal of interest at this time in the problem of Processing, and accordingly plans were made to devote the meeting to this single subject. In addition, it was felt that this type of program would reach and hold the interest of a great majority of the members of the New York Rubber Group, since it might aid them in many of their daily problems and also lay a pattern for future meetings.

Therefore, it was decided to divide it into Mixing, Calendering and Extrusion and to have a separate panel of rubber technologists handle each of these problems separately. The Committee selected men from the rubber industry with particular experience in various branches of equipment manufacture and manufacturers of rubber goods, including tires, calendered goods, extruded goods, footwear, insulated wire, etc.

In order that each panel would have ample time to prepare answers to specific questions, members of the New York Rubber Group were solicited in advance and asked to submit questions. Scores of questions were received and these were turned over to the panel members about two weeks before the date of the meeting. For obvious reasons, it was decided not to consider new questions from the floor at the meeting but if time allowed discussion on the answers would be permitted.

A leader for each of the panels was selected from among various leading rubber machinery manufacturers. He was asked to give a short talk on the mechanical developments in his particular field as they related to the subject under discussion. The leader then was to read each question and indicate the man on the panel who would answer it.

The three panels met after luncheon on the day of the meeting and spent the afternoon comparing and discussing their answers. Then each question was assigned to one of the panel members for answer at the meeting. In some cases, two or more men agreed to give an answer to the same question.

From all indications the meeting proved most satisfactory—both from the standpoint of subject matter and the method of handling the subject.

Thanks are due to the members of each panel who so willingly gave of their time and knowledge; to the members of the Program Committee and the Executive Committee for the many hours spent in arranging all details of the meeting; to our Secretary-Treasurer, Peter P. Pinto, who did most of the work in collating and editing this material for publication; and to Miss Doris Lubben, of Johns-Manville Corporation, and Miss Harriet Cole, of RUBBER AGE, who so ably handled the stenographic work at the meeting and the typing of this report.

SIMON COLLIER,
Chairman, Program Committee

Opening Talk by Mr. George J. Wyrough, Chairman:

I want to thank the various members of the panels who agreed to act as experts today, and to the Program Committee, of which Simon Collier is chairman, for arranging this program. These men worked very hard, and we hope that we have something to offer that is different and new, as well as instructive. In planning this meeting we had to tread rather cautiously because, to our knowledge, no program of a similar nature had been attempted before by any of the other rubber groups.

In order to attract an outstanding panel in each group, we thought it necessary to use only questions received in advance from members, as some might not desire to act on the panels if there were free questions from the floor. We received a large variety of questions, which I think will fill up the time completely. If there is time for discussion, will each speaker please give his name and company affiliation, so that the stenographers may make a record of it. We plan, if there is enough interest, on publishing the results of this meeting.

The Chairman then introduced the members of the first panel.

MIXING

Panel Members:

D. A. COMES (Leader), Assistant Sales Manager, Farrel-Birmingham Co., Inc., Ansonia, Conn.

E. N. CUNNINGHAM, Field Engineer, Stanco Distributors, Inc., New York, N. Y.

F. B. DAHLINGER, Superintendent, Mixing and Calendering Department, Raybestos-Manhattan, Inc., Passaic, N. J.

G. D. KRATZ, Vice-President, Norwalk Tire & Rubber Co., Norwalk, Conn.

J. A. SCELLEN, Chief Chemist, Pequanoc Rubber Co. Butler, N. J.

Talk by D. A. Comes:

In looking back over the history of synthetic rubber, it all seems so simple now that it is rather hard to remember some of the troubles we ran into during the first experimental periods. You are all familiar with the synthetic rubbers—the neoprenes, Thiokols, Buna N's and Buna S's—all played their definite part and a decision was made to standardize on Buna S or GR-S, as it finally became known.

Most of the original plant development work was run in our testing laboratory in Derby. No one knew how to mix or break down this combination of butadiene and styrene. We had a report from Germany that the way to soften this GR-S was to use a hot oxidizing breakdown. Since I had just come out and advocated the high speed oxidation of natural rubber, I was inclined to think that the German report was probably correct.

We conducted the first tests in the Derby Laboratory running the GR-S up as far as 400 to 425° F., dumped it and sheeted it about ¼" thick and spread the hot material around on the floor so it could be subject to the maximum amount of oxidation. There is no question but that this method permanently softened the material. But, as we soon found out, it also destroyed the physical properties and in a short time was discarded in favor of a lower temperature or even compounded without first breaking down the material.

In the dispersion of pigment into either synthetic or natural rubber it is essential to keep the batch in as stiff a state as possible so the pigments can be thoroughly rubbed out and dispersed. The work in an internal mixer of the Banbury type is done not between the tip of the rotor and the sides but in the mass itself.

I well remember the trouble we encountered in an insulated wire mix in two No. 11 Banburys. These machines were both in the same company but in different plants. In the first plant they had no trouble dispersing the pigment and it was only necessary to change the screen on the strainer once or twice a day. In the second plant the pigment was so poorly dispersed that it was necessary to change the strainer screen every batch or two. I was called to the plant in trouble and found that the operator was first loading in his crude rubber, all of his reclaim and all of his softeners. Since this material was for insulated wire it had a very high percentage of reclaim. The mass in the Banbury rapidly became soft and tacky and into this was loaded the fillers. By simply pulling aside the cans containing all the softeners, having the operator load in his crude rubber and his reclaim, and at the end of a minute or a minute and a half start loading in his fillers and when these were incorporated into a plastic to then add the softeners, we obtained a material that had a perfect dispersion and that strained without plugging up the screen.

This brings us to the so-called upside-down mixing. You undoubtedly all know about this although at one time it was considered a very secret process. Upside-down mixing consists of loading all the pigments into the Banbury first and then throwing the rubber into this mass. This, of course, gives an ideal dispersing method as you get the maximum load period as the stock breaks over from a mass of fine particles of rubber coated with pigment to the plastic state. However, although it may be the theoretical way to mix, it is extremely hard from the mechanical standpoint as I have seen a No. 11 go from idle load to 1000 h.p. within the first ¼ minute. I believe that a question has been asked in the question period about this upside-down mixing and we will again touch on that point.

Before I sit down and turn the meeting over to the experts, I would like to point to one more example. We believe in higher speeds and heavier pressures, but it is necessary to have the correct batch size and also necessary to discharge in a fairly short cycle to keep the temperature of the batch down, as higher speeds and heavier pressures definitely increase the temperature of the mix.

As an example, a customer brought down pre-weighed batches of GR-S heel stock. They were to be run in our Size 3A Banbury and they were all too large. The proper batch size would have been about 125 lbs. and all of his batches were 150 lbs. Using the standard rpm on this size machine, which is 35, I was able to get this batch together in an over-all time of twelve minutes, despite the fact that it was too large and it reached a temperature of approximately 290° F. I then increased the speed of the rotors to 70 rpm and tried to mix the same large batch. Due to the size I was unable to get the material thoroughly mixed in a short time and when I dumped it the batch had burned. I then pulled the batch apart and reduced it to its proper size of 125 lbs. This was loaded into the Banbury at the higher speed and made a thorough dispersion in an over-all time of five minutes, dumping a batch that had a lower temperature than the one run at the lower speed. I use this example to emphasize the fact that when the higher speeds and heavier pressures are used, it is necessary to dump in a much shorter cycle in order to keep the temperature within safe limits.

I am now going to turn this meeting over to the Board of Experts and there are a number of very interesting questions to be discussed, and on some of these I would like to enter the discussion.

Question No. 1— Banbury mixing of natural rubber vs. GR-S: (a) Is the natural rubber now available more difficult to process than pre-war material? (b) What are the relative processing times of current grades of natural and GR-S? (c) Relative rotor speeds and temperature of processing?

Answered by Mr. Dahlinger: (a) Yes, it is more difficult to process. The difficulty is that the crude natural rubber we get today seems to be much tougher and not as uniform as pre-war natural. All the crude natural should be blended by lots or cases to insure some degree of uniformity before you use it in the finished mixing. If you have to use crude rubber without pre-masticating, it has been found that higher temperatures will prevail.

(b) Processing time of natural versus GR-S varies according to the different types of formulas. By and large, the over-all picture shows that GR-S requires approximately 10% more mixing time. This, of course, is due to the required additional fillers and fluxes that you have to add to GR-S to wind up with finished formulas which will compare with a natural formula.

(c) On natural, with a rotor speed of approximately 29 rpm, the temperatures which we attain are approximately 200 to 225° F. Take GR-S, compare it to the same rotor speed of 29 rpm, and the temperature will climb up to 240 to 260° F. There again formula enters the picture, that is, with the GR-S you have to load your formulas so much more than you have to with a natural formula.

Question No. 2—What is your opinion of the Mooney scorch test as a means of predicting processing safety?

Answered by Mr. Schildhauer: This was discussed around the table after lunch, and the uniform opinion was that the Mooney machine properly used is a good indication of the scorch characteristics of a stock. Now, I believe I can say without too much criticism from our laboratory people that we have found this to be a very convenient and accurate means of determining the scorch characteristics of a compound regardless of what it is made from—that is, whatever the base polymer is. However, for any particular type of compound or for any particular type of polymer, you must have a little experience accumulated about the behavior of these stocks in a rubber factory as against data you get from a Mooney machine. It is possible to correlate this, but again, you have to use a normal amount of intuition and experience to make your correlation work.

The second comment we received on this was that the Mooney scorch test is a very good means of predicting processing safety. The scorch test will show if the formulation is touchy. Also, we have found that the dump temperature or the general temperature which this stock is going to undergo is around 250° F. Then your Mooney scorch test is run at that temperature, and let's say if you find that the Mooney machine indicates it is getting stiffer after about 10 to 12 minutes that would be considered a scorchy stock, but if you can run it for let's say 20 minutes in a Mooney machine and find that it still hasn't increased its Mooney number but a few points, then that could be considered a safe stock. That is a general statement and you have to work through your factories and see how many times this stock is going to be recycled through tubers or how many times you are going to have to re-work your stock.

In conjunction with the Mooney machine a quick modulus test in combination with the Mooney machine may be used. The Mooney scorch test requires about 20 minutes, whereas the Mooney plasticity requires 4 minutes. The modulus can be run coincidental with it.

Question No. 3—What is your opinion of "upside-down" Banbury mixing procedures compared with normal methods? The former involves the addition of rubber or synthetic rubber to the dry filler which was dumped into the Banbury before the addition of any elastomer or softener.

Answered by Mr. Katz: As Mr. Comes stated in his introductory remarks, apparently the upside-down method of Banbury mixing has certain possibilities. On the other hand, there are certain advantages and disadvantages that we have noted which can be outlined as follows:

For example, an advantage is that in some cases the batch size can be drastically increased. This usually requires adding the fillers very rapidly and also increasing the temperature which is necessary to make the mix. However, it throws a rather heavy load on the equipment. Another advantage might be that it is suitable for highly loaded stocks, some of which have a tendency to crumble on ordinary mixture. With an upside-down batch this tendency is somewhat reduced. In our case, most of the upside-down batches have been made with highly loaded stocks such as for shoe soling. We have found that upside-down batches have been desirable for cotton flocks or any material hard to mix into the rubber mixture. The procedure is to dump the pigments and cotton flock into the mixer and let it run around for a while and then introduce the other materials.

We have had difficulty in making normal masterbatches containing insoluble sulfur but have found the use of upside-down mixing quite advantageous. For example, in making up a 25% masterbatch of insoluble sulfur using GR-S, clay and oil, our procedure has been along the following lines: We introduce the sulfur, clay and oil; after 2 minutes add the rubber; after 7 minutes clean the ram and discharge in 8 minutes, sheeting out to ¼ inch. The final material is entirely free from lumps.

On the other hand, an upside-down batch seems to have certain disadvantages. The power factor is very high and quite variable. Also, to make the mix, the Banbury must be in absolutely peak condition. In other words, there must be no leaks or loose parts whatsoever. Further, we feel that the stocks mixed upside-down are often much different than those mixed in the normal manner. Upside-down mixing has certain possibilities which might be considered for unusual or freak stocks.

Question No. 4—In mixing stocks containing more than one kind of elastomer, do you have any preference with respect to the order of addition of the different elastomers?

Answered by Mr. Scellen: In general, we believe that the elastomers which are approximately equal in hardness or time of breakdown are best broken down together. However, when one of the elastomers is appreciably harder than the others, it is better to put the hard material on the mill or in the Banbury, break it down first, and then add the soft material to it. For instance, if you were adding Vistanex to polyvinyl chloride, put the polyvinyl chloride on the mill and when it is soft and very hot add the Vistanex which has previously been creped through the mill once or twice. The batch will cool somewhat by the reduced friction and having the cooling water on full. This method gives a smooth mix. By trying to break them down together you get granular dispersion of the polyvinyl chloride in the mix.

Question No. 5—Can you supply processible all-carbon black formulas at 40 and/or 50 Durometer hardness made from standard GR-S and GR-M? Processibility to be judged by smooth calendering and extrusion, and retention of dimensions of the calendered or extruded product.

Answered by Mr. Dahlinger: This is a tough one. We did not have a GR-S formula, but I am going to tackle a GR-M formula with 50 Durometer. It is made up of the following parts:

GR-M	100
Stearic Acid	2
Agerite Gel	2
Pelletex	50
Mineral Rubber	10
Brown Substitute	36
Light Calcined Magnesium Oxide	4
Sunproof	2
Altax	1½
Zinc Oxide	5

This formula by actual practice has been mixed on both Banbury and open mills. As far as pretreatment of the raw polymers—no pretreatment was given whatsoever. In answer to question of post-treatment, we found we didn't have to give this any post-treatment. This particular compound has been extruded and you do get a fairly smooth product.

Also answered by Mr. Cunningham: We know, at least the panel decided, that there were people in the country who were making compounds which need a so-called 40 Durometer hardness, but we don't know how they do it. That is not a disparaging remark, we just don't know. The recipe which I thought up might be as follows:

GR-S	100
Stearic Acid	5
Sulfur	2
Brown Factice	50
Processing Oil (that might be about twice too high)	10
SRF Black	50
Santocure (for the accelerator)	.85 to 1
Zinc Oxide	5
Protective Wax	2

I have no idea how this would extrude. You should be able to mix it without any difficulty, provided you use a Banbury type mixer. I believe it would be a little difficult to mix on a mill with a short mixing time.

Question No. 6—What precautions must be taken in Banbury mixing to prevent fires when sulfur is added to the mix?

Answered by Mr. Comes: You don't have fires when you add sulfur in a batch in the Banbury. In one such case which came to our attention, we found on investigation that the fire was due to a lighted cigarette thrown into the batch and not to the sulfur.

Question No. 7— It has been observed that GR-S clay stocks show considerable variation in physical properties. Is this due to improper dispersion of the clay, the sulfur, or both? What precautions can be suggested?

Answered by Mr. Kratz: Like the person who sent in this question, we have found that there are variations with the use of clay in recipes, particularly at high percentages. On the other hand, the variation in physical properties was due probably to the improper dispersion of either the clay, the sulfur, or both. In this connection the batch size is of considerable importance. Another point we neglected to notice for a long time is that clay should be thoroughly dried, although under our conditions of storage this was not possible. Nevertheless, if the clay is even slightly moist you will get poor dispersion and a lumpy product. We produce a high percentage of heavy loaded stocks and so far have had very little difficulty. Our experiences have been chiefly with the Banbury rather than the open mill, and we have encountered no variation with Banbury mixes even with 300 lbs. of clay in a 500 lb. batch.

We cannot make a single batch job satisfactorily. In every case where we get good dispersion we have had to go to a two-pass mix using high speed on the X stock and low speed on the finish. For example, for a 500 lb. batch containing 300 lbs. of clay, our mixing times are: after 1 minute we add all the powders; after 4 minutes add oil; after 5 minutes clean the ram; 8 minutes, discharge, and after 10 minutes are ready for the next batch. The finish is made at low speed. We add the accelerators first; add sulfur after 3 minutes; total time 6 to 7 minutes on the finish.

With regard to the use of clay in upside-down batches, we have not had very good success. Usually we do not get the dispersion that we can obtain when using a two-pass job with normal mix.

Question No. 8—What are the advantages of mill and Banbury type mixing on synthetic stocks?

Answered by Mr. Dahlinger: I suppose that this question really means mill versus Banbury type mixing. I know my answer will meet very much with the approval of Mr. Comes. My answer is that there is no comparison between the two. We feel the Banbury type mixing has all the advantages over a mill mix. First, you've got your cost, labor, equipment, time and power. I don't think there is very much more to put on the answer.

Question No. 9—What is the recommended procedure for mixing of carbon and mineral-loaded Butyl stocks to obtain maximum smoothness and minimum shrinkage for extrusion?

Answered by Mr. Cunningham: We will picture rubber as shipped to the rubber factory with a Mooney between 40 and 50. For most applications no further mastication is necessary. In order to get the most efficient mixing out of a Banbury, the batch size should be increased by at least 10% by volume. I don't believe that is solely the property of Butyl. I believe we agreed with most synthetic stocks it is better to use somewhat larger batch size than natural rubber. For the No. 11 Banbury, which would ordinarily carry 430 to 450 lbs. of a stock having a gravity of 1.14 to 1.16, the batch size should be increased to 475 lbs. or even 500 lbs. When a Butyl compound of the same gravity is mixed, we believe that the batch size should be increased when you compare it with natural rubber. The following mixing procedure is representative of most Butyl inner tube stocks:

0 minutes—load in Butyl, zinc oxide and stearic acid
2 minutes—load ½ filler and all softeners
4 minutes—remaining ½ filler
5-6 minutes—clean ram and throat
7 minutes—dump

Again, we would like to emphasize that Butyl requires less power to mix, being somewhat softer than natural, and that the best mixing is obtained by crowding the Banbury, so to speak, but at the same time watching that the temperature doesn't get too high. These remarks are based on limited experience and apply to obtaining smooth extrusions.

There are several materials which can be used to improve extrusion. Among them is an experimental polymer manufactured by Standard Oil, known as PS-60. In addition, for certain types of extrusion, it is possible to use a polymerized vegetable oil, Plastogel XLX, but it contains some unsaturation. Therefore, it is necessary to compensate for this by adding more sulfur to the recipe. This works very nicely with most mineral-filled stocks, but does not work the same way with stocks loaded with carbon blacks. Another material which has been used to obtain smooth extru-

sions is Piccolastic D-75. Mineral fillers, like Celite and hard clays, when used in loadings of above 50 volumes, give smooth extrusion.

There is very little difference between mill mixing and Banbury mixing of Butyl stocks, so far as extrusion properties are concerned, but in mill mixing it is necessary to develop technique because Butyl does not mix as well on the whole. If batch temperatures get up around 250° F. to 275° F., the compound develops nerve. I found that some panel members disagreed with me, for it is the practice of some rubber companies to run Banburys hot when mixing Butyl stocks. Batch temperature will range around 350° F. at time of dump. This may be a little high because sometimes it is difficult to measure these temperatures accurately. In this type mix, sulfur is not added at the tail end of the mixing cycle, but is added on subsequent mixing operation. This type of mixing is generally used for inner tube stocks and there may be some question about whether the smoothness or glossiness necessary for green inner tubes would meet the requirements of a smooth extrusion for something like channel stripping or window panels.

The best suggestion is to design a compound suitable for the required service using a plasticizer, if necessary, which will give good extrusion properties. Then the mixing cycle is designed also to give good extrusion. Stiffer stocks will void in a Banbury, and the softer the stock the less the void.

Question No. 10—What advantages can be obtained by the use of reclaimed synthetics?

Answered by Mr. Scellen: Many of the advantages of reclaimed synthetics when added to the synthetic from which it is made are the same as natural rubber reclaims when added to the natural rubber. Right now the main advantage of the synthetic reclaim is to increase the quantity of synthetic available, because of shortage of various synthetics, and I think reclaim is helping out a lot of the users of these materials. Reclaimed synthetics enable a person to do faster mixing. You have a pre-mixed material and can produce a larger volume in less time than by starting out with raw materials. Reclaimed synthetics also will give more uniformity from batch to batch and reduce a lot of the inaccuracy in compounding.

The reclaimed synthetics sometimes add special properties to the stocks. One instance might be with Butyl reclaim in ignition wire. There is the definite advantage of increasing the ozone resistance of this wire. Also, the use of Butyl reclaim seems to assist in the extrusion of Butyl inner tubes, and there is some evidence that it reduces the sulfur bloom on the tube. We still aren't sure about this and are checking it. Synthetic reclaims also help processing at lower temperature and, thus, indirectly cut down scorching or pre-curing. Finally, the synthetic reclaims do reduce the cost of the stock in many cases. This cannot always be achieved but in the great majority, cost reduction without reduction in quality can be shown.

DISCUSSION:

Mr. H. E. Outcault, St. Joseph Lead Co., New York, N. Y.: There was a fire in a batch at a rubber company in Erie, Pa., due to a severe static condition. It was overcome and corrected by grounding the batch, using special precautions, and I thought it might be an interesting question to answer for those who might have had this problem. I'm glad nobody else had the experience.

Dr. I. Drogin, United Carbon Company, Charleston, W. Va.: My question deals with Mooney scorch. Would a stock that is under-accelerated give you a practical scorch value, a value that you could depend on?

Answered by Mr. Cunningham: If you had a stock which was under-accelerated, we are assuming it would not cure to the expected tensile within, let's say, 45 minutes at 287 ° F. I am sure you would be able to tell that this stock would not scorch due to the acceleration, but I do not know whether or not you would be able to determine exactly whether or not this stock if it contained channel black would not stiffen at, let's say, 250 ° F. in the Mooney machine. It has been our experience, and this is limited, that even a masterbatch without accelerators or curing ingredients will stiffen to a certain degree when run in a Mooney plastometer at 250 °F. When you do devise a technique for using a Mooney machine, you must take this into consideration. The common practice is to run a masterbatch containing all ingredients except sulfur and accelerator and then compare with that the stock which is expected to be run with sulfur and accelerators.

Mr. Wise, Vulcan Proofing Company, Brooklyn, N. Y.: What is the recommended procedure for incorporating cotton flock into GR-S in the Banbury in relatively small percentages—say up to 20%?

Answered by Mr. Kratz: We have not gone up as high as 20%. Our procedure has been to add cotton flock and then whatever powders or clays are required, and then the oil.

CALENDERING

Panel Members:

G. V. KULLGREN (Leader), Manager, Contract Engineering Division, Adamson United Co., Akron, Ohio.
OTTO J. LANG, Chief Chemist, Armstrong Rubber Co., West Haven, Conn.
R. R. LEWIS, Technical Superintendent, Vulcan Proofing Co., Brooklyn, N. Y.
HENRY B. MORSE, Chief Chemist, Rubber Footwear Division, Endicott Johnson Corp., Johnson City, N. Y.
A. F. SCHILDHAUER, Laboratory Director, Rubber Coated Fabric Plant, E. I. du Pont de Nemours & Co., Fairfield, Conn.
W. E. SCOVILLE, JR., Development Department, Mechanical Goods Division, U. S. Rubber Co., Passaic, N. J.

Talk by G. V. Kullgren:

There are more calenders, of various sizes and types, now on order than ever before in the history of the rubber industry. It is only natural that progressive equipment manufacturers have attempted to improve these new calenders toward the end of providing accurate quality control of the product to be processed with these new machines. Similarly, the processes of rolling steel, paper and aluminum have been improved and simplified during recent years. The goal, of course, is always to attain a superior product and increased production at lower cost.

It is only very recently that any major advances in this direction have been noticeable, since practically all of the calenders in use today in the rubber industry are not much different than those which were placed in operation twenty years ago; yet, the process of calendering is most important, as evidenced by the fact that the calender operator enjoys the highest rate in the mill room. This rate can be justified for two reasons; first, he requires considerable skill to be able to produce a satisfactory product from the usually old and venerable machine he operates, and second, a day's production from a calender, if it were to be scrapped, would be almost a financial disaster to most manufacturers.

It was only three or four years ago that any substantial improvement in calenders was seriously considered, and this mostly at the instigation of the then young but rapidly expanding plastics industry. However, at about the same time, the machinery manufacturers were suddenly faced with the tremendous requirements of the government-sponsored tire plant expansion programs. New designs had to be put aside in the interest of standardization to get more machines into production in the shortest possible time. Consequently, it is only now that the first calenders incorporating major improvements are being placed into operation.

Since all equipment improvements must be justified economically, it is interesting to note some basic figures regarding the savings available by improvements in the process of calendering rubber stocks. For example, if you are running stock approximately 54 inches wide, and assuming that the compounded stock at the calender is worth 40c per pound, a reduction in your working tolerance of .0005 will mean a saving of nearly 2c per yard of material processed. If you average 10 yards per minute with an eight-hour day, the savings from this alone would mean $25,000 per year. Any major improvement which would justify such a reduction in tolerance would probably also result in higher production speeds and reduction in scrap or rejects, with further substantial savings to the manufacturer. With all the signs pointing toward higher material and labor costs in the future, it is to be expected that the demand for improved calender processing equipment will be accelerated.

The present new designs of calenders now being built or engineered are not being stimulated by the rubber industry, but by its young associate, the plastics industry. This comes about mainly because in the plastics industry the calender is a finishing machine, whereas in the rubber industry the material from the calender is always subject to further processing, including vulcanization, which can effectively cover up indifferent calendering.

In the plastics industry, as in the rubber industry, two major requirements in calendering are, first, uniformity of gauge; second, uniformity of material. By this I mean that any portion of the product should have the same chemical and physical characteristics as any other portion. In addition, however, the plastics industry has also a third requirement—that of uniformity of surface appearance. This third requirement is of relatively little importance in rubber calendering.

In the calenders now being manufactured for the plastics industry, we can observe certain trends in engineering design which are aimed at improving the ability of these new machines to meet these requirements more accurately and to allow controlled scientific operation. Since it is apparent that any such improvement might be profitably employed in the rubber industry, a brief discussion of these trends in design might be of interest. Some of the design changes which aid the operator in meeting the first requirement—uniformity of gauge—are as follows:

Greater rigidity in rolls to reduce roll deflection: The use of larger diameter rolls has been one change in this direction. For example, we are now building a calender with 36-inch diameter rolls. However, this is not all gain towards minimizing deflection, as the larger diameter roll also produces a higher separating force due to the greater nip area. There is also under way a thorough investigation of new high yield strength metals as a possible substitute for the present grades of chilled iron now generally in use.

Stabilizing the journal bearings: The conventional roll journal bearing always has a certain clearance between the journal and the bearing to allow for thermal expansion. This permits the roll journal to move, with respect to the roll box, under various conditions of roll separating forces and varying torques as exerted by the driving gear. In some of the oldest calenders the use of stave-lined or half bearings emphasized that little or no attempt was made to control the roll journal, except under full load conditions. These clearances made it difficult to accurately control gauge.

The first tendency in the newer design calenders was towards the use of preloaded sleeve bearings of various designs wherein the roll journal was never permitted to completely unload, but was always forced toward its normally loaded position. This was accomplished by having the idle half of the bearing being movable and under pressure from hydraulic jacks or, in some cases, a separate auxiliary journal box was used to force the main journal towards its normally loaded position. This improvement effectively eliminated some of the bearing instability, leaving only one variable uncontrolled, that of the oil film. The oil film is subject to change from many causes, including speed, load and temperature.

The more advanced designs of calenders now employ the use of precision roller bearings. These roller bearings can be pre-loaded so that there is no clearance in the bearing at the normal operating temperature of the calender. Since roller bearings do not operate on an oil film, but run metal to metal, this last cause of bearing instability can be eliminated.

Precision type roll adjustment: Wear of the threads on the adjusting screws and nuts and excessive play in the gearing that operated the adjusting screw has always been detrimental to uniform and accurate gauging. The newer designs have precision type gearing operating the adjusting screw, equivalent in accuracy to that found in the finest reduction units. All slack in the adjusting screw and nut is eliminated by the use of hydraulic rams forcing the box against the screw at all times. Adjusting screw speeds are considerably reduced, providing adjusting rates in the order of .015-inch per minute so that an operator with the heaviest thumb can obtain accurate results. This also makes the roll adjustment suitable for use with automatic gauging equipment, if desired. Two-speed individual motors, one for each adjusting screw, with mechanical or electrical synchronizing equipment, allows further flexibility in calender operation, the high speed being used for rough gauging and low speed for normal precision adjustment.

Roll deflection compensation: As many of you know, it has often been proposed that calender roll deflection be

compensated for by crossing the axis of the rolls. Calenders with this arrangement have been in operation in Europe for some years. It is of particular value where a wide variety of unsupported materials must be sheeted, involving a wide range of separating forces. This is usually true where a manufacturer has only one calender on which he must process a great variety of products. It is impractical to remove the rolls and re-crown them for the particular job at hand, and so he usually compromises with an average crown which permits only a few of his products to be accurately calendered. It also places limitations on the compounder, since the stock must not be too soft or too tough at the calender. This feature of crossing the rolls is being incorporated into some of the new calenders now under construction. It, of course, involves some mechanical complications since the rolls develop a thrust under this operating condition but this can be very adequately handled by the use of roller bearings.

Some of the improvements towards obtaining uniformity of material as processed in the calender are also of interest:

Uniform temperature across the roll face: A common difficulty in calendering has been the inability to maintain uniform temperature across the face of the roll. This can easily result in a non-uniform product since the material at the edges has been processed at a different temperature than the material in the center. One cause, of course, is that the ends of the roll have a different cross section than the center of the roll. Considerable heat is lost through transfer to the relatively cool bearing box and calender frame, and through the exposed ends of the roll. This is particularly true where attempts are made to run high temperature at the center of the roll and simultaneously to keep the bearing cool by use of water cooling on the bearing box.

Newer designs use roller bearings which will operate at relatively high temperatures. Accurate temperature control of the roller bearing lubricant to maintain the roller bearing at a high temperature will improve this condition considerably. Another arrangement is to use a drilled roll in which the temperature controlling medium circulates in a labyrinth similar to that used in a steam platen, the labyrinth being located about 1½ inches below the surface of the roll.

Temperature control: The problem of accurate automatic temperature control of the calender roll surface is still a very real one, with no completely satisfactory solution yet in operation. The devices and equipment for changing the temperature of the roll surface are well-known and easily obtained. The main problem is finding means of continuously measuring the roll surface temperature accurately while the calender is running. No doubt a solution for this problem will be found as accurate temperature control becomes of even greater importance as time goes on.

While the problem of uniformity of surface appearance of the product is not of particular importance in the rubber industry, the improvements made in this direction will probably be of casual interest:

It is well known that roll surface condition has considerable effect on the surface appearance of the calendered product. In the calendering of plastics materials, particularly thin films, the surface condition of the last two nip rolls is of great importance. These have to be reconditioned at fairly frequent intervals in order to maintain a satisfactory finish on the product. In most cases re-finishing of the rolls requires some time and it is rather expensive to have the production machine out of service for this operation. Consequently, the newer machines have provisions for quickly changing the rolls, similar to the practice followed in the steel industry. Spare rolls with proper surface treatment and crown are kept available and it is expected that a roll change can be accomplished in an hour, or less.

These trends in design, of course, represent only major changes to accomplish the specific purposes described. There have also been numerous refinements in mechanical design, such as improved gearing, greater rigidity in frames, more complete enclosures and guarding, all of which contribute toward making the new calenders highly efficient machines.

Along with improvements in the calender itself, there can be observed trends toward more elaborate calender accessory equipment. This is particularly true for fabric coating operations in the tire industry. For instance, the present widespread use of rayon, and possible future use of other synthetic cord materials, has required considerably more accurate control of fabric tensions, temperatures and humidity than were ever required with ordinary cotton cord. Here, also, these controls must be adjustable so that provisions can be made for running various types and qualities of material with some assurance of being able to control and predict the characteristics of the finished product. Also, in many cases it has been found that the percentage of scrap material can be reduced and subsequent processing operations simplified by the use of adjustable constant tension controls at the calender wind-ups.

In cases where large production runs of the same material are required, as in tire plants, it has been found undesirable and uneconomical to stop or change the speed of the calender for the purpose of changing rolls either at the let-off or wind-up stands. Any change in calender speed or stopping of the calender—even momentarily—affects the uniformity of the product and, of course, reduces the average production speed of the equipment. Fairly elaborate provisions have been made in the newer installations so that sufficient fabric storage is allowed at both the wind-up and let-off stands to permit the operators to change the rolls without affecting the speed of the calender.

While all these improvements have increased the user's capital investment in the calendering process, the plastics industry has found these advanced designs to be economically desirable, in fact, economically necessary. The rubber industry can well afford to study the calendering processes with a view toward utilizing some of these improvements and gaining the subsequent advantages—more efficient material utilization, higher production speeds, better product, and reduced costs.

Question No. 1— In the manufacture of light colored Butyl rubber compounds, particularly red colored that is highly loaded with inert materials such as clays and whitings, excessive sticking to the calender rolls has been encountered. The removal of softeners and the addition of zinc stearate and stearic acid has had little effect. Calender roll temperatures from 100 ° F. to 150 ° F. have been tried also without success. What is the solution?

Answered by Mr. Schildhauer: The first thing to do when calendering Butyl rubber is to forget all experience built up in handling natural rubber and other synthetics. If stickiness and scorching are encountered

when running natural rubber, experience dictates that calender temperatures must be lowered. However, just the opposite procedure must be followed in calendering Butyl rubber—temperature must be raised. Butyl rubber is very highly saturated and difficult to cure. Therefore, high temperatures can be utilized without danger of scorching. As the temperature is increased, the stock gets tougher and it leaves the calender roll more easily. I would recommend temperatures in excess of 200 ° F. —possibly as high as 225 ° F. for highly loaded stocks. Another thing to watch is the tendency of Butyl rubber to follow the coolest roll on the calender. Therefore, run the middle or face roll somewhat cooler than the other two—about 10 to 15 degrees. Also run the front warm-up mill roll cooler than the back roll. This procedure will usually be satisfactory with compounds containing less than 50% Butyl rubber. It might be added that if a black loaded compound is possible, calendering will be somewhat less difficult.

Also answered by Mr. Lewis: Mr. Schildhauer's suggestion is helpful, but I would think that the addition of release agents would still be helpful. Stearic acid did not help but perhaps a little higher percentage might, or the use of a little paraffin wax. I am sure that release agents of this type will be helpful with Butyl compounds.

Question No. 2—Can you supply processible all-carbon black formulas at 40 and/or 50 Durometer hardness made from standard GR-S and GR-M? Processibility to be judged by smooth calendering and extrusion, and retention of dimensions of the calendered or extruded product. What special procedures in the operation of calender or tubing machines are required to process these formulas?

Answered by Mr. Scoville: We feel that the previous panel on mixing has overlooked a point of mixing. It has been our experience that mixing is rather an important part of the running of these softer compounds. In the case of GR-S, we have had very good success with hot break with the formation of B gel. An article in the August, 1945, issue of *Industrial and Engineering Chemistry* by White, Ebers, Shriver, and Breck covered this. We have found that particularly where we are running press-cured or plated rubber sheet where shrinkage has been a serious problem, that hot break has overcome a lot of the problem of shrinkage.

In the case of neoprene, or GR-M, we haven't had the same success. We find premasticating for 3 to 5 minutes just prior to adding fillers has advantages. It is necessary to run relatively high amounts of plasticizers of the chemical types in either of these materials. It is necessary to sacrifice some of the physical properties, particularly in tensile strength, to produce a satisfactory product. A release agent is very important to these compounds. In the case of GR-M, a small percentage (5-10%) of GR-S has lent quite a bit of assistance.

The next thing to consider in your problem is what special handling is necessary. In the curing of long sheets of plated or press-cured rubber, shrinkage is important because of sheets shrinking after they have been calendered. The excessive gauge on ends is poor success when it comes to curing, particularly in the longer lengths where surface pressure is relatively small per unit area. We have found that one of the first things to consider is to insure that the first ply of stock when it is run off adheres to the liners which are used to build on. The second thing to do is to use large drums on which to run the calendered sheet. The purpose of this is to give you less material built up on itself because the weight of the material itself results in distortion during handling before processing.

Another thing to consider is that after the material has been calendered and is to be prepared for press curing insure adequate time and place so that the shrinkage can take place in a normal way. We don't want the end of the sheets to build up heavy just before curing.

Also Answered by Mr. Schildhauer: With respect to a neoprene composition of 40 to 50 durometer, there is no doubt that it is a very tough stock to handle but if calendered at a very slow speed, such as 5 or 6 yards per minute rather than at normal calender speeds, a much better sheet can be produced. We don't know the thickness of the calendered sheet the questioner had in mind but if it is over 1/16" it should be run in an apron and plied up 1/16" layer at a pass. As high a calender temperature as possible will assist in keeping the sheet smooth. There should be careful balance between temperature and speed.

Another factor we have found to be very successful in eliminating air blisters in the calendered sheet is not to feed up the slabs directly from the warm-up mill to the calender but rather hang slabs on the mill frames for 4 to 5 minutes in order to cool down somewhat. This will toughen the stock, cause better working in the bank, and eliminate chances of air blisters.

Question No. 3—How can blisters be avoided in the calendering of light colored mineral loaded 30-40% GR-S stocks?

Answered by Mr. Morse: In such stocks we have found that blisters can be avoided in the type of calenders used in footwear manufacturing, which consist of three rolls and a fourth roll offset with a sturdy bank bar between the top and offset rolls, if the bank of rubber stock is kept continuously rolling and not allowed to climb and flop over on itself. The temperatures on the calender rolls are from 150° to 170 ° F.

Also answered by Mr. Scoville: For the heavier calendered sheets in this highly loaded stock, we have found it advisable to run out the compound in relatively thin plies on a liner. The liner with compound is stored for 8 to 12 hours. This gives air trapped in material time to work its way out. The stock is then plied up cold on the calender. We allow .005 to .008 squeeze between the two bottom rolls for every ply.

Also answered by Mr. Lewis: Assuming that the question refers to coating applied to fabric not too thick but fairly thin, blisters can be divided into two different categories. The questioner may be talking about the railway track type of blisters on the calender which occur when the fabric goes in and are caused when an air blister is trapped between the rubber film and the roll. To correct this type of blister, mount a little air bar close to the center roll where the fabric enters, then free the compound and run it over the air bar. This permits the blister to get out.

The most serious type of blisters are the small blisters that appear in the film as it travels around the back of the middle roll. These little blisters travel down the middle roll after they are sucked in with the feed so

that blistering primarily becomes a compounding problem. If you can compound stock so that you get a smooth rolling bank you should be able to eliminate blisters. However, we have not succeeded in doing so.

There is one other thing that we have found helpful. Perhaps you are running your top roll on friction motion. It might help to put the top roll on the same motion as the center roll and less air will be sucked through. Running a pencil bank on the bottom will also effectively eliminate these little blisters if the type of work will permit.

Question No. 4— Describe briefly the procedure and technique of manufacture of 20-30 mils skim coating on sheeting using 50% neoprene compound with black loading.

Answered by Mr. Schildhauer: We realize that there are factors that cause stocks to stick to calender rolls when they contain as high as 50% neoprene. Probably the most important factor is to select a good release agent. Another suggestion would be to calender at as high a temperature as possible but that is difficult as not much of a range is possible with a 50% GR-M composition. We also suggest that something be tried that hasn't been tried to date, that is, using the new NC neoprene polymer which is very much tougher and will permit higher calender temperatures and, therefore, might strip more easily from the calender rolls. Another suggestion would be to use a substantial portion of channel black, if possible, to stiffen up the compound.

Also answered by Mr. Lewis: I do not consider this a problem unless you want a real high class job. You have to have an oily type of release agent to keep it from sticking and temperatures of 170° on the middle roll and 250° on top are satisfactory. The reason the gentleman asked the question is probably because 20 points or 30 points is rather a thick coat for a film entirely free from defects. I would suggest that two coats would probably be necessary.

Also answered by Mr. Scoville: Referring to press-cured material where we can augment the pressure of the calender with the pressure of the press, there is one trick that is of assistance, realizing, of course, that it is necessary to use proper release agents—that is, do not depend on bottom roll pressure. Don't squeeze the fabric and neoprene together with the bottom rolls. Leave the bottom rolls open when taking the skim off. We augment the bottom roll pressure with a hinged weighted roll which bears against the bottom roll. This is cloth covered. This applies enough pressure to get reasonable adhesion for handling, and we depend on the press pressure during cure to force the material to bond with the sheeting.

Question No. 5— What precautions are necessary to control the gloss and building tack of calendered goods, such as for footwear, proofed goods, etc.?

Answered by Mr. Morse: We have found that to obtain the gloss on footwear stocks, as well as building tack, we have a minimum of 75%, preferably 85%, of the rubber hydrocarbon in the stock in the form of natural rubber. Using proper plasticizers and the proper blend of batch and scrap and temperatures of 160° to 180° on the calender rolls, the calendered stocks come out with a good gloss which is retained in the vulcanized shoes. During the war, when the stock contained mostly GR-S, we could not get a gloss on the stock.

Also answered by Mr. Lewis: When we want gloss on a piece of rubberized cloth, we buy some lacquer and put it on. We always finish our material with corn starch, or talc, or some kind of powder finish. Gloss in proofed goods is not part of the process. It is something that is put on top. Suitable tack for subsequent laminating can be preserved by winding in treated liners.

Question No. 6— How can shrinkage be reasonably controlled in GR-S, neoprene and Butyl stocks with various volume loadings?

Answered by Mr. Schildhauer: This question was partially answered in Question 2, particularly the GR-S phase of the problem. However, in handling neoprene, there are some factors that can be taken into account, particularly when working on some of the higher durometer compounds (60-70 range) which are normally handled. First of all, select raw neoprene that has the proper plasticity. Neoprene GN plasticity ranges from P1 to P5 and we would recommend P2 as being about right. Then load it fairly high with carbon black, at least 125 parts, and do a good job of mixing. Allow the stock to age well at least 72 hours before going to the calender. Then given it a good work-out on a warm-up mill and calender at as high a temperature as possible without sticking.

It is important to get rid of as much orientation as possible. Here again, a slow moving calender is much to be preferred to normal speed. I again refer to 5 to 6 yards per minute instead of 15 or more yards per minute. After calendering, it is advisable to allow the stock to lay in the liners for at least 48 hours before removing it, or better still, if it could be rolled out on a table, maximum shrinkage would take place in a few hours. We presume that this stock will be handled and cured in a relaxed position rather than in a press.

Also answered by Mr. Morse: We have found that our shrinkage problems have been helped materially, whether the stocks contain standard or non-staining GR-S alone or a combination of these types of GR-S and natural rubber, if, instead of using all standard or non-staining GR-S, we use a blend of two parts of either of these types of GR-S and one part of what is known as X-285 GR-S.

Question No. 7— What dusting powders are recommended for calendered sheet which would cause minimum difficulty in plied finished goods?

Answered by Mr. Lewis: If a dusting powder must be applied to a calender sheet to enable factory operators to handle it prior to subsequent laying together, there is only one type of powder that would be satisfactory and that would be a type that melts during the subsequent curing operation. We use zinc stearate very satisfactorily. I believe other metallic stearates might work but zinc stearate is most available and lowest in price. There has been some mention that corn starch might be used for the purpose. I don't think so because it is not absorbed during cure and the use of corn starch

or talc would require that the surface must be freshened by swabbing with solvent.

Question No. 8— What are the processing differences in calendering operations for rayon and cotton?

Answered by Mr. Lang: The processing differences between cotton and rayon depend largely on the basic characteristics of the two materials. Cotton is a natural product of relatively short staple fibre with an average length of about 1 inch. Rayon, a man-made material, is extruded through spinerettes and as it is used in tire cord is a continuous filament. This filament may be extruded miles in length before it is cut off and twisted into cord of whatever length can be handled practically. Cotton fibre on the other hand is of irregular shape and when these fibres are twisted into cord, the cord surface is hairy and presents a large area to which rubber can adhere. Rayon is like steel wire, very smooth surface with no protuberances to which rubber can cling.

Rayon, as used in fabrics, is made of cut staple. That is, the material as made is chopped into relatively short fibres which are then twisted and woven similarly to cotton. Adhesion to this type of fabric is considerably improved over the continuous filament type, but is still not nearly as good as to the cotton.

Where good adhesion is required, it is necessary to give rayon a pre-treatment. There have been numerous patents taken out on pre-treatments of rayon, particularly of rayon tire cord. One of the early methods was known as the RFL Treatment; that is, resorcinol and formaldehyde mixed with latex. The resorcinol formaldehyde forms a resin which hangs on to the smooth rayon and the rubber from the latex bonds to the rubber which is calendered on to the product. Mixtures of casein and latex serve the same purpose, and during the war natural latex was superseded by latex of the GR-S types and dispersed reclaims.

In the pre-treatment of the rayon tire cord rather elaborate equipment has been developed. Depending on the speed of the operation drying chambers of various sizes are used. Close control of tension is required during this operation to avoid excess shrinkage in the length of the tire cord.

Another difference between cotton and rayon is in the hygroscopic nature of the two materials; that is, the tendency to pick up moisture from the air. Rayon tire cord is purchased on the basis of 11% moisture regain. Cotton is bought on the basis of 6½%. Rayon once it is dried picks up moisture very rapidly from the air, depending on humidity conditions, and much more rapidly than cotton.

In order to get the best adhesion to these materials, they should be dried down to a low percentage of moisture before calendering. For tires, we attempt to hold this moisture content to 1½% or less, and in order to attain this we have in our calendering setup a series of 20 steam-heated drying drums over which the fabric passes before going into the calender. Rayon has its maximum strength when it is dry and the strength decreases with the moisture content so that the drying serves a double purpose of maintaining maximum strength and giving best adhesion.

Once the rayon has been pre-treated it is handled through the calender in approximately the same way as cotton tire cord and very little difference is noted in the calendering.

EXTRUSION

Panel Members:

J. F. ALLEN (Leader), Manager, Hydraulic Machinery Division, National-Erie Corp., Erie, Penna.

T. K. Cox, Western Electric Co., Inc., Baltimore, Md.

J. J. MILLARD, Development Department, Mechanical Rubber Goods Division, U. S. Rubber Co., Passaic, N. J.

OTTO J. LANG, Chief Chemist, Armstrong Rubber Co., West Haven, Conn.

Talk by J. F. Allen:

The screw type of extrusion machine, a means for the continuance fabrication of processed rubber compounds and thermoplastics, is familiar to all, and the improvements necessary and making possible the construction of the present heavy-duty units required for the efficient production of the newer synthetic materials and stock formulations are:

1. The fully enclosed double reduction herringbone and worm gear drives and anti-friction roller bearings to replace the conventional open spur gear drives and marine type babbit lined thrust units.

2. Extremely hard mirror liners for the cylinder, application of hard surfacing materials to the edges or land of the screw, the development of quick opening die fixture adaptors, and the quick opening end delivery combination straining and slabbing head.

With the introduction of thermoplastics, new problems in design were soon to follow. With warm mix strip feeds the conventional rubber extruder, having the cylinder and dies heated to the proper extrusion temperatures, were found to produce a satisfactory product. However, with the introduction of materials of granular or powder form for continuance hopper feed, it was found necessary to cool this section and to increase the cylinder length to provide necessary heating zones to properly plasticize the compound before forcing it through the die. Most plastics were found to require that internal parts be made of corrosive resistant materials, a requirement that has been met through use of special alloy No. 306 liners, Z-nickel, stainless steel and other similar materials.

Our entry into the war, with scarcity of natural rubber, brought about the development of the synthetic rubber industry, for which it was to be our pleasure to supply the extruders for dewatering and batch clean-up operation, and later, for the tire expansion program, many of the extruders, all of which were of standard, conventional rubber design, required for production of tread, tubes and the required mechanical goods.

Stock screw and die design is still very much in the controversial stage, and if machines are to be standardized, it will require closer cooperation between the producer of raw materials, fabricator of the finished product and the machinery manufacturer.

Question No. 1— Can you supply processible all-carbon black formulas at 40 and/or 50 Durometer hardness made from standard GR-S and GR-M? Processibility to be judged by smooth calendering and extrusion, and retention of dimensions of the calendered or extruded product. What special procedures in the operation of calender or tubing machines are required to process these formulas?

Answered by Mr. Millard: Forty durometer neoprene extrusions have been and are being made; my advice to any compounder receiving an inquiry for such a compound is to refer it to those companies now furnishing them.

There is no practical commercial 40 durometer neoprene compound which I would care to recommend for normal extrusion work. Where the extruder is being used as a means of preparing stock for another process more latitude in finish and shrinkage is permitted and compounds highly loaded with oils and low in black can be compounded to meet 40 durometer.

Forty durometer GR-S compounds with black loading are more practical and can be made if the physical properties are not too important and the use of factice is permissible. A typical compound of this nature is given below:

GR-S	100.0
Zinc Oxide	5.0
SRF Black	45.0
Factice	40.0
Stearic Acid	2.0
Paraffin Wax	2.5
Tetra Methyl Thiuram Monosulfide	0.55
Sulfur	1.9
Cumar AX	5.0

This compound mixed on an open mill will result in an exceedingly smooth tubing stock without excessive shrinkage. Mixed in a Banbury the stock will not be as smooth unless particular attention is paid to pre-breaking the GR-S. No unusual extruding procedures are required.

Fifty durometer neoprene compounds are more practical and two recipes are given below. No. 1 is a high grade compound with smooth extrusion properties and not too excessive shrinkage which can be used on small tubes, rectangular shapes or simple extrusions. No. 2 again uses factice and while physical properties are not as good as No. 1, it is recommended for almost any intricate strip.

No. 1

GR-M	100
Zinc Oxide	1
SRF Black	25
Medium Light Process Oil	2
Stearic Acid	3
Altax	1
Magnesia	5

No. 2

GR-M	100
Zinc Oxide	1
Thermatomic Semi-Reinforcing Black	130
Factice	75
Medium Light Process Oil	12
Magnesia	5
Cumar AX	5

Again, normal extruding techniques are practical and more attention should be paid to the pre-breaking and mixing of the neoprene. The GR-M should be broken enough to smooth out the stock but not too much so as to cause sticking to mill rolls.

A 50 durometer GR-S stock is also given:

GR-S	100.
Zinc Oxide	5.
SRF Black	100.
Cumar AX	6.
Paraffin Wax	3.
Dibutyl Sebacate or Phthalate	30.
Tetra Methyl Thiuram Monosulfide	.4
Litharge	.4
Sulfur	1.8

This last is an exceptionally good extruding stock with fairly good physical properties.

On all of these compounds advice on tubing procedure is of little value since most tubing machines are in varying states of wear which reflects tremendously on results. The general starting point—hot die, cool barrel—is the only advice we would care to give.

Of far more importance than tubing technique is the manner of breaking and mixing GR-S. A hot break is recommended and where high B gel can be tolerated, results in smoothness and speed will be gratifying.

Question No. 2— Tread Extrusion of Natural Rubber vs. GR-S: What are (a) Relative rates of extrusion?, (b) Relative extrusion temperatures?

Answered by Mr. Lang: As regards relative rates of extrusion between GR-S and natural rubber tread stocks, there is not a great deal of difference in rates of extrusion. Regarding temperatures at which treads are extruded, GR-S treads extrude considerably hotter than natural rubber. They come out of our tubing machine in the range of 260° to 275° F. which is about 40° to 45° hotter than natural rubber. We try to keep natural rubber below 245 ° F.

Question No. 3— Has there been any test developed to determine when the age of neoprene reaches an "over-age" condition which results in poor processibility?

Answered by Mr. Millard: If uncompounded neoprene is in question then the answer is that no generally accepted test is used. However, any one interested in this problem could easily set up such a test, setting the standards according to the limits the manufacturing equipment or commodity being made could tolerate.

A scorch test, using a standard recipe, with a short, low-temperature cure, say 10 min. at 5 lbs., then running tensiles and elongation, should be of value. Standards could be set on modulus.

Since over-age neoprene also increases in plasticity, a plasticity test such as a Mooney or Williams should be of value. Again, since satisfactory processibility varies with type and condition of equipment, standards should be worked out for each case.

All of this, however, is a backhanded way of meeting the basic problem. Any of the above tests would be needed or of value only if over-age neoprene is a recurrent problem. This should not be the case. Ordering of neoprene should be scheduled so that it is used within three months and no trouble will occur. For the infrequent case which might occur, any indication of trouble from old neoprene should mean diverting all neoprene from that shipment to less exacting processes or commodities.

Question No. 4— What are the primary differences between processing of GR-S, neoprene and natural rubber stocks for high speed extrusion for continuous vulcanization?

Answered by Mr. Cox: (a) *Comparison of GR-S with Smoked Sheet*—1. Crude GR-S is much more difficult to break down or plasticize than natural rubber. Best results are obtained when GR-S is masterbatched with a filler such as zinc oxide or carbon black to aid in the

mechanical break-down of the GR-S nerve and with the addition of peptizing agents for chemical plasticizing. Masterbatching of natural rubber is only necessary in high rubber content stocks and where very thin wall insulation is required.

2. GR-S stocks reach higher temperatures in the same period of mixing time, therefore better cooling of the mixing equipment is desirable.

3. Fillers, particularly zinc oxide, are more difficult to disperse in GR-S stocks.

4. GR-S stocks normally require higher screw speeds and higher head temperatures. Due to the shortness of the unvulcanized stock at high temperature, best extrusion is obtained at die size or with a slight swell. Natural rubber stocks on the other hand are commonly insulated with a slight draw.

5. More accelerator is required to obtain the desired cure with GR-S stocks causing them to be more susceptible to scorch.

6. GR-S stocks when prepared for high speed extrusion are often tacky causing sticking on the mill rolls which requires constant attention of the operator to prevent transferring to the back roll.

7. GR-S stocks are much softer when cold. This results in a reduction of mill roll and shear plate breakage during the warm-up period.

8. We have found the mixing time required for the preparation of a GR-S 56% RHC by volume stock for dual extrusion of a .026-inch wall of insulation at an extrusion rate of 2.45 cubic feet of compound per hour is 21 minutes per cubic foot of compound prepared, whereas a 50% RHC by volume rubber stock to do the same job only requires 14 minutes per cubic foot, or approximately two-thirds the time required for GR-S stock.

(b) *Comparison of Neoprene with GR-S and Natural Rubber*—1. Neoprene stocks are much more heat sensitive than either GR-S or crude rubber stocks and for this reason cannot be mixed or worked too long at any one mixing stage. Neoprene stocks have the habit of curing slowly all the time they are at elevated temperatures regardless of whether the curing agents have been added or not. Best results are obtained when the temperature at any mixing or working stage does not exceed 210° F. and is cooled to 100° F. or lower as soon as possible after each mixing or working period.

2. Neoprene stocks require better cooling of the mixing equipment than either GR-S or natural rubber to prevent setting up in process.

3. The heat sensitiveness of neoprene stocks make them very difficult if not impossible to strain.

4. Due to the short stage mixing periods required to maintain low mixing temperatures, it is sometimes difficult to get good dispersion of some fillers in neoprene stocks.

5. Mixing time for neoprene is less than that required for either GR-S or natural rubber. Masterbatching is not required. We have found that the time required for the preparation of a neoprene 50% RHC by volume stock for extrusion of .020-inch wall of insulation at an extrusion rate of .86 cubic feet per hour is 9.3 minutes per cubic foot of compound prepared. Time required for the preparation of a 57% RHC rubber stock for the same job is 18.7 minutes per cubic foot. Preparation time required for jacket stocks for extrusion at a rate of 2.08 cubic feet per hour is as follows: GR-S Stock, 19.4 minutes per cubic foot; Neoprene Stock, 7 minutes per cubic foot.

Extra Copies of Panel Discussion

For those desiring additional copies of the Panel Discussion on Processing of Natural and Synthetic Rubber, copies of this issue of RUBBER AGE may be obtained at the regular price of 35c per copy until March 15, 1947, and 50c per copy thereafter. Send remittance to

Circulation Manager, Rubber Age,
250 West 57th St., New York 19, N. Y.

Summarizing, GR-S and neoprene stocks require more attention and better cooling than natural rubber stocks. The mixing time required for neoprene stocks is approximately one-half that of natural rubber stocks, while GR-S stocks require approximately one and one-half as much time as that required for natural rubber.

Question No. 5— What has been done on development of equipment for the simultaneous extrusion of two types of stocks into a single unit?

Answered by Mr. Allen: No development work on co-extruded stocks has been attempted by the machinery manufacturers, but the Goodyear Tire & Rubber Co. and the U. S. Rubber Co. have developed such a head. Should the question deal with the application of a colored stock to wires and cables or a trade-mark to a finished product, it is usually applied by means of an auxiliary tuber attached to the die head.

Question No. 6— How effective is the Garvey die in the laboratory to determine the extrusion processibility in the plant?

Answered by Mr. Millard: The Garvey die in the laboratory is effective in determining extrusion processibility in the plant only within certain limits. It offers a means of determining smoothness of finish and it also offers a comparative method of grading extrusion speeds on medium and better grade compounds that depend solely on the tubing machine for the rate of production.

In processes where a material such as hose or wire is being covered at high speeds and a takeaway mechanism is a factor, the Garvey die has limited value, or no value. First, it does not give any indication of ability to withstand scorching or blistering during sustained extruding at high speeds ranging from 100 to 800 feet per minute. Again, since the takeaway mechanism is usually running faster than the extruder, the stock must be capable of stretching in the raw and the Garvey die does not show this up.

All-reclaim, or low grade stocks which do not feed readily in the tuber, are not suitable for evaluation by this method. The non-uniformity in feed is highly magnified in a laboratory set-up and results in erratic tests which are of no value.

Again, the Garvey die used in the laboratory is operating under ideal and highly controlled conditions using small size tubers. The results cannot always be corroborated when applied to factory conditions using larger tubers (delivering larger volumes of stock), tubers in various stages of wear, and conditions not nearly as well controlled as in the laboratory.

Editorials . . . . . .

Season's Greetings

THE past twelve months, representing the first full peacetime year since the end of the war, have witnessed many a hectic event in the industrial world. Even at this late date industry is still beset with numerous problems, unforeseen at war's end, which continue to delay the return of normal activity. The rubber industry, for example, still faces shortages of its basic raw material and numerous chemicals and compounding ingredients. Nevertheless, looking back at the holocaust of the war, and considering the economic and political difficulties of most of the other nations of the world, we in the United States have a good deal to be thankful for and can look forward to the future with optimism and confidence. On the occasion of this holiday season, the staff of RUBBER AGE and RUBBER RED BOOK wish to express their best wishes to their friends for a completely happy and prosperous 1947.

THE PUBLISHERS

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Holland Conference

THE communique issued by the Rubber Study Group after its five-day conference at The Hague in Holland the week of November 25th, the third such conference held by the group, was statistical in nature. Its major conclusion pointed up the fact that despite increasing optimism on the part of rubber-consuming nations, based on reports in the last few months, factual data indicates clearly that there will be a world shortage of natural rubber during the coming year, most pronounced in the first half of that year. Final figures produced during the conference indicate a possibility of some 1,200,000 long tons of natural rubber, of which approximately 500,000 tons will reach the United States.

Based on the figures contained in the official communique, it seems evident that insofar as the United States is concerned the production of approximately 500,000 tons of synthetic rubber is a requirement for 1947. Although consumption of rubber, both natural and synthetic, is expected to drop somewhat from the record 1,000,000 tons which will be consumed this year, consumption in 1947 is still expected to reach about 950,000 tons. If we can expect only 500,000 tons of natural rubber, then obviously synthetic rubber must make up the balance. If natural rubber must continue to be doled out equitably to domestic rubber manufacturers, based on an insufficient supply, then the specification controls now contained in Rubber Order R-1 must be continued for an indefinite period of time.

The statistical position as outlined at The Hague would also seem to indicate that the return of free trading in rubber, again insofar as the United States is concerned, must be postponed for the time being. According to George M. Tisdale, vice-president of the U. S. Rubber Co., and one of the American advisors at the Holland conference, discussions at The Hague and in London "developed information that until natural rubber is in adequate supply such a move in the United States could only result in speculation and higher costs." Mr. Tisdale pointed out in a special press conference held immediately after his return that the offer of higher prices for natural rubber would have little, if any, influence on increasing production, since food and labor are the principal bottlenecks.

However, according to the figures emanating from the conference, estimated world consumption of natural rubber in 1947 has been set at 1,700,000 long tons. Since world production has been gauged at 1,200,000 tons for 1947, and only 500,000 tons will reach the United States, that means that the rest of the world will consume 700,000 tons of natural rubber in that year. This would indicate that consumption in the rest of the world, other than the United States, is almost double that of prewar days and is almost equal to our own greatly increased consumption. Some doubt might be expressed as to the ability of the rest of the world to reach such a consumption figure.

There is a definite question mark in the conclusions drawn at the Holland conference, and that is in regard to the figure of 500,000 tons of natural rubber which the United States can expect during 1947. Since the Combined Rubber Committee, which formerly allocated rubber to the various rubber-consuming nations, will not function next year, and since free trading, even though limited by numerous restrictions, has been restored by the British and will soon be restored by the Dutch and the French, the United States must secure its natural rubber direct from the rubber producers themselves. Is it not possible that we will secure a greater amount than 500,000 tons? Is it not feasible that the British, Dutch and French, greatly in need of dollar exchange, will see to it that more rubber reaches this country? Is it not within the realm of possibility that the rest of the world will not reach a total consumption of 700,000 tons of natural rubber? It seems premature at this stage to say that the United States will receive only 500,000 tons of natural rubber during 1947, unless agreements of some sort between the producing and consuming countries were reached at The Hague which were not revealed by the official communique.

CURRENT NEWS OF THE MONTH

RUBBER STUDY GROUP FORESEES SYNTHETIC AS FACTOR FOR AT LEAST NEXT TWO YEARS

THE major conclusion reached by the International Rubber Study Group as a result of a five-day conference held at The Hague in Holland from November 25 to 29, the third such meeting held by the group, was that synthetic rubber production in the United States will be a necessary factor in making over-all world production of rubber meet the estimated demand. This conclusion was contained in a special communique from the meeting released in London on November 29 by the British Board of Trade. Delegates from the United States, Great Britain, France and the Netherlands attended the conference, the American delegation being led by Donald D. Kennedy, chief of the International Resources Division of the Department of State. Associate delegates included P. W. Litchfield, John L. Collyer, A. L. Viles, Alan L. Grant, E. G. Holt, George M. Tisdale, H. C. Bugbee, W. L. Batt, and William T. Phillips.

In its communique, the Rubber Study Group estimated that 1946 production of rubber will amount to between 1,700,000 and 1,800,000 long tons, including 940,000 tons of synthetic rubber, and that consumption will reach 1,600,000 tons. This consumption estimate allowed no margin for stockpiling or increases in working stocks which would easily absorb much if not all the excess production of the year. However, it was pointed out, the widening margin of production over consumption may eventually cause disequilibrium in rubber markets.

The Group also estimated that consumption of rubber in 1947 will rise to 1,700,000 tons, with a levelling off to 1,675,000 tons in 1948. At the same time it predicted that natural rubber production will probably rise to 1,200,000 tons in 1947 and 1,500,000 tons in 1948, giving a total world potential production of natural and synthetic rubber of approximately 2,000,000 tons.

It was emphasized, however, that the disequilibrium between the productive capacity of the world and its consumption which was foreseen at the very first meeting of the group is, while not anticipated for 1947, still contemplated as a possibility in the course of two or three years.

Estimates Are Optimistic

Considerable optimism prevailed at the five-day conference with regard to the production of natural rubber. A spokesman for the Netherlands predicted that 350,000 tons would be exported from Indonesia in 1947. Borneo, Sumatra and Java were reported to be currently producing at the rate of 22,000 tons per month. Estimates for French Indo-China were placed at 30,000 tons, with that figure considered too low if labor conditions during 1947 are at all favorable.

Delegates to the conference were in general agreement that the cost price of natural rubber will be difficult to calculate for the next two years or until a rice surplus can again be accumulated in rubber-producing areas. The price of rice has a direct bearing on rubber costs and rice quotations reflect the political state of the area concerned; therefore, so long as unrest exists there can be little hope for stability in rice or rubber.

Other Conference Reports

With regard to the eventual competitive angle between natural and synthetic rubber, the communique indicated that for some uses one kind of rubber may be preferable to another, but there will be an area of competition in which either kind is suitable and manufacturers are likely to be guided in their preference by the relative costs of the two materials.

In other cases, however, national policy may determine the amount of synthetic and natural rubber used. That might mean, for instance, that the United States would use synthetic rubber in order to utilize its war-expanded synthetic rubber plants, while Britain might lean toward natural rubber in which the country has a heavy financial and productive interest.

The group approved a tentative plan for its fourth meeting to be held in Paris early next summer, with final decision as to time and place to be determined in the future. It was also decided to recommend that henceforth all countries substantially interested in rubber be invited to attend the meetings of the group. Accordingly, it is expected that the Paris meeting will have a much broader representation.

Nothing was done during the conference to clarify the relations between the London rubber markets and other markets in which free trading is now permitted and which are somewhat complicated by exchange controls. It was indicated that within the limit of the same controls France will permit free trading in rubber after the first of the year.

Prior to the opening of the conference, Dr. Pieter Honig, deputy director of the Department of Economic Affairs of the Netherlands Government, and head of the Dutch delegation of the Rubber Study Group, issued a statement urging establishment of a new international rubber control plan which would permit working out an arrangement between producers of natural and synthetic rubber. He advocated this plan "as the only solution of the problem of potential over-production."

Report on American Consumption

In connection with the communique issued by the Rubber Study Group, it is interesting to note that according to the latest report of the Rubber Manufacturers Association, issued on November 29, it now seems definite that the United States will consume over 1,000,000 tons of rubber this year. Consumption of rubber, both natural and synthetic, for the first nine months of the year amounted to 750,281 long tons. September consumption was 89,812 tons, as compared with 89,891 tons in August.

A breakdown of the figures indicates that the American rubber manufacturing industry consumed 584,220 long tons of synthetic rubber and 166,061 tons of natural rubber for the January-September, 1946, period. In addition, a total of 200,739 tons of reclaimed rubber were consumed. Of the synthetic rubber consumed in the period, 487,815 tons were GR-S, 60,556 tons were Butyl rubber, 31,567 were neoprene, and 4,282 tons consisted of the nitrile rubbers. The report pointed out that only 648,500 tons of rubber were consumed in the entire year of 1940, the previous peacetime record.

According to a report from Singapore, rubber shipments from Malaya in November totalled 79,650 long tons, including 20,200 tons destined for the United Kingdom and 53,023 tons for the United States. A recent report from Malaya also indicated that some 96,000,000 pounds of rubber, which sold for $26,500,000, were collected from Japanese dumps after the liberation of Malaya. Disposal of these funds must await the eventual peace treaty with Japan.

Changes in Rubber Order

Continuing to reflect the improved position of rubber supply in the United States, a further change was authorized in Rubber Order R-1 by the CPA Rubber Division on November 15. Under the terms of Rubber Order R-1, as Amended November 15, 1946, 36 additional types of products may now be made with some natural rubber, the amount of natural rubber which may be used in 28 other products was increased, and manufacturers of another 121 items are now permitted to use as high a percentage of butyl rubber as they wish.

The new specifications for products, contained in Appendix I of the Rubber Order as reissued, permit an increase of about 1% in the amount of natural rubber which now may be used. They authorize the use each month, either for consumption or for improvement of inventory, of 38,000 long tons of natural rubber, 52,000 tons of GR-S, and 7,000 tons of GR-I. Present schedules of neoprene, both dry and latex, and the nitrile rubbers call for the production of approximately 6,000 long tons of these rubbers per month.

All reference to chlorinated natural rubber has been eliminated from the order and from Appendix I because this material is now considered a finished product. In general, restrictions on the manufacture of rubber belting have been relaxed, although most types of belting are still limited as to the amounts of natural rubber permitted. Conveyor and elevator belts are permitted 35 per cent natural rubber. The color of belting must be black except when for use in contact with unpackaged food.

Butyl in New Products

Previously, with only minor exceptions, all butyl rubber has been channeled into the production of inner tubes for tires. Improvement of the supply of butyl and the availability of more natural rubber for inner tubes permits the use of butyl in new products. In addition, any manufacturer may now use 200 pounds per month for experimental purposes without specific authorization. Formerly, only 25 pounds were allowed.

Heretofore, 25 pounds of natural rubber latex per month were permitted for experimentation in products other than cement. In the future, because of the extreme shortness of supply, no natural rubber latex will be permitted for experimentation except on appeal. All restrictions in the use of GR-S for experimentation have been removed.

Items which are now permitted the use of some natural rubber include axle bumpers, bowling balls, hard rubber combs, pipe bits, serving trays, insulator tubing, mucilage spreaders, wringer rolls, baby carriage topping, hospital sheeting, and ear plugs. Changes in the permissible amount of natural rubber to be used covered, among other items, brake lining, hard rubber tubing, all printing rubber products, rubber-covered industrial rolls, bathing caps, sponge for all purposes, rubber tape, and rubber bands. As indicated, the use of butyl rubber was approved for numerous products.

Other Changes in Order

On November 29 CPA issued an amendment to Appendix II to Rubber Order R-1, authorizing some increases, requiring a negligible amount of rubber, in eight minor changes. Other changes made were for the purpose of clarifying the language of the Appendix and did not affect its provisions.

Under the terms of Amendment No. 1 to Rubber Order R-1, as Amended November 15, 1946, issued on November 29, new automobiles delivered after December 16 can carry spare tires and tubes. This decision, long opposed by tire dealers and distributors, was reported to have been based on record tire production. Incidentally, according to CPA, the output of passenger car tires in October reached 6,700,000 units, a gain of 14% over the 5,900,000 units produced in September.

Standard Plasticizer ODN

A new plasticizer, known as Plasticizer ODN, has been introduced by the Standard Chemical Co., Akron, for use in the compounding of nitrile rubbers and the various vinyl resins. The plasticizer is particularly recommended by the company for use in the nitrile rubbers where high elongation, low Durometer hardness, resilience, and good low temperature flexibility are requirements. Properties of the plasticizer, which chemically is octadecene nitrile, include a specific gravity of 0.83, a flash point ranging from 350° to 358° F., a vapor pressure at 210° F. of 0.1, a boiling range from 640° to 680° F., and a freeze point ranging from —33° to —38° F.

Huber Appoints E. J. Geise

The appointment of Edward J. Geise to its technical service staff has been announced by J. M. Huber, Inc., New York. Mr. Geise, a chemical engineering graduate of Rensselaer Polytechnic Institute, has been associated with the U. S. Rubber Co. for the past ten years at the Naugatuck (Conn.) Footwear Plant, last serving as chief chemist of that plant. During the war period, Mr. Geise organized and directed two seminar courses in rubber technology at Yale University for the War Training Program. He also served as a member of the Rubber Footwear GR-S Technical Committee.

Cooper Withdraws Registration

The Securities and Exchange Commission reported on November 26 that a number of companies had withdrawn registration statements filed with the Commission because of unsettled market conditions. The registration recently filed by the Cooper Tire & Rubber Co. was one of those withdrawn.

PASSENGER TIRE PRODUCTION RISES 1.35% IN SEPTEMBER

Production of passenger car tires by American manufacturers in September rose 1.35% over the previous month, increasing from 5,790,850 units to 5,869,047 units, according to the latest statistical report of the Rubber Manufacturers Association. For the first nine months of 1946, production was estimated at 47,320,982 units, as compared with 17,049,233 units produced during the corresponding period of the previous year.

Output of truck and bus tires totaled 1,364,004 units in September, an increase of 8% over the 1,263,016 units produced during August, while production for the first three-quarters of 1946 amounted to 11,391,012 units, as contrasted to the 13,228,729 unit output of the similar period of 1945. Total production of automotive pneumatic casings in September increased 2.54% over the previous month, rising from 7,053,866 units to 7,233,051 units, while total output for the first nine months of 1946 was reported at 58,711,994 units, as compared with 30,277,962 units for the corresponding period of 1945.

September production of passenger car, truck and bus tubes totaled 7,286,936 units, against 7,032,135 units produced in August, an increase of 3.62%, while the nine-month output of 1946 rose to 53,661,278 units from the 29,345,263 units produced during the similar period of the previous year.

September shipments of passenger car tires amounted to 5,625,632 units, an increase of 2.41% over the 5,493,075 units shipped in August, while inventories at the end of September increased 13.01% over the previous month, from 2,288,409 units to 2,586,035 units. Shipments of truck and bus tires declined from 1,331,460 units in August to 1,316,978 units in September, a decrease of 1.09%, while inventories increased 9.24%, from 718,031 units at the end of August to 784,347 units at the end of September.

Passenger car, truck and bus tube shipments totaled 6,734,792 units in September, a decrease of 2.82% over the 6,930,537 units shipped during the previous month, while end-of-September inventories increased 12.87% over inventories at the end of August, rising from 3,928,912 units to 4,434,596 units.

Out of total factory shipment of passenger car tires for the first nine months of 1946, amounting to 46,450,166 units, 7,075,282 units were shipped to automobile companies for original equipment and only 429,164 units were shipped for export, leaving a balance shipped for domestic replacement purposes of 38,945,720 tires. This compares with the replacement figure for the first nine months of the previous year of 16,110,426 passenger car tires.

The report covered only automotive pneumatic casings and inner tubes. It did not include figures on solid rubber tires or on pneumatic tires for motorcycles, bicycles, farm, industrial, or aviation equipment.

BABCOCK & WILCOX REPORTS ON USE OF BUTADIENE EQUIPMENT

Recommendations for more effective use of 27% chromium-iron equipment employed in making butadiene from petroleum are contained in a series of reports prepared recently by the Babcock & Wilcox Tube Co., 85 Liberty St., New York 6, N. Y. These recommendations are based on studies originally made for the Rubber Reserve Company, now the Office of Rubber Reserve, Reconstruction Finance Corporation.

Laboratory tests were conducted by Babcock & Wilcox under the supervision of H. D. Newell, chief metallurgist of the company, and pilot plant and plant exposure tests were made by the operating companies participating in the Metals Research Program. It was found that the relative chemical inertness of the 27% alloy under alternate reducing and oxidizing conditions, such as are encountered in the catalytic dehydrogenation of N-butane, warranted the use of this material for equipment for making butadiene.

Up to the present, its use in these processes has been confined primarily to preheater tubes, process piping or liners for such piping, headers, "snake" tubes, and catalyst tubing fittings in dehydrogenation plants using unit or tubular type catalyst case constructions. Some of the alloy also has been used for protection tubes of thermocouples measuring catalyst bed temperatures, for catalyst support screens and plates in vessel reactors, and for sheets or baffles in catalyst vessels to prevent gas infiltration back of the refractory linings.

Service examinations by Babcock & Wilcox mainly involved 27% chromium-iron tubing removed from butane dehydrogenation service. An attempt was made to correlate the characteristics observed under actual service with the data established previously under carefully controlled laboratory conditions.

The company feels that, in general, embrittlement, due to the sigma phase precipitation or "885° F. embrittlement" (or both), appears to be the one most deleterious factor curtailing the useful life of this alloy in hydrogenation plants. Sigma phase is a brittle intermetallic iron-chromium compound which forms in alloys containing more than 25% chromium on long heating in the range from about 950 to 1250° F. Its precipitation causes increased hardness and drastic loss of ductile properties.

Recommendations have been made concerning subjects such as welding repairs, avoidance of notches, elimination of shock stresses, elimination of 885° F. embrittlement, and heat treatment to remove sigma phase.

For welding, Babcock & Wilcox suggests the use of a nickel-bearing austenitic or partially austenitic welding electrode. The material should be preheated before welding, the stress relieved at 1300° F. immediately afterwards, followed by rapid cooling.

Avoidance of sharp notches and reentrant angles in design or repair, as well as folds, nicks, scratches or stamping of numbers is recommended by the company. Shock stresses should also be avoided, but if required, should be performed when metal is at 555° F. or higher. The use of copper gaskets on certain types of flanges and hand hole fitting seats has helped maintain tight, leak-proof joints. Graphite, applied to threads and contact areas of bolted fittings, is said to reduce galling and sticking.

In order to avoid 885°F. embrittlement, the company advocates relatively rapid cooling after service through the 1100 to 700° F. range. Below 700° F., the cooling should be more moderate. Sigma phase may be removed by heating for not less than one hour at a minimum temperature of 1500° F., and quickly cooled through the range of 1100 to 700° F., so as to avoid the 885° F. embrittlement.

Control of regeneration procedures at all times is prescribed to prevent overheating. An excessive temperature is described as one that is high enough for carburization of the metal, which probably means temperatures in excess of about 1700° F. Ordinarily, the maximum temperature reached during normal operations of dehydrogenation should not exceed about 1350° F. except during the heat treatment for sigma phase removal.

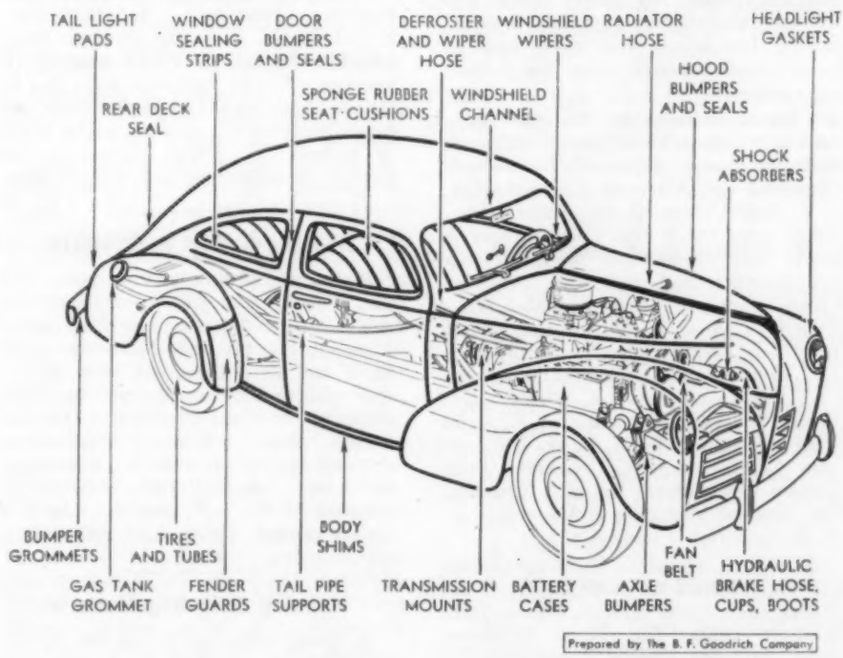
Duroflex Re-Named Plastiflex

Calresin Corp., 8564 West Washington Blvd., Culver City, Calif., has announced that the name of its new rubber-like plastic has been changed from Duroflex to Plastiflex. Development of Duroflex, now Plastiflex, was first announced several months ago. At that time, it was believed that the material was most suitable for use in making flexible molds in which other plastics, ceramics, plaster, cement, low-temperature metal alloys, and wax could be formed into useful shapes by casting. According to the company, it now appears that the new thermoplastic may have even greater possibilities as an injection molding compound which can be used to make rubber-like balls and other flexible playthings for children, plus numerous household and business gadgets.

Correction

In the article "Acetylene Black in Rubber," by G. Benson, which appeared in our January, 1946, issue, reference was made to the fact that it is possible to calculate dimensions of the crystallites in carbon blacks from a study of diffraction patterns. The crystallite volume of Shawinigan black was indicated to be about 4.5 μ^3. The author has since advised that it should have been shown as 18 μ^3.

APPLICATIONS OF RUBBER IN CURRENT AUTOMOTIVE CONSTRUCTION



Use of rubber in automotive construction has been constantly increasing during recent years until in today's new cars there are approximately 265 places in which it is employed to give greater passenger comfort and longer service to the automobile. In the sketch above, prepared by the B. F. Goodrich Co., Akron, 23 specific applications are indicated. Goodrich believes that its Torsilastic rubber spring will be utilized in cars of the future, thus again extending the use of rubber in various types of automotive construction.

COLLIER, WATERS AND WILSON HEAD NEW YORK RUBBER GROUP

The election of officers for the coming year was the highlight of the annual Winter Meeting and Christmas Party of the New York Rubber Group, held at the Hotel McAlpin in New York City on December 13. Simon Collier, of the Johns-Manville Corporation, was elected chairman, and J. E. Waters, of the General Cable Corporation, vice-chairman. B. Brittain Wilson (*India Rubber World*) was elected secretary-treasurer and G. C. Maassen (Vanderbilt) as sergeant-at-arms.

Three new three-year members of the Executive Committee were chosen, these being Jean H. Nesbit (U. S. Rubber Reclaiming Co.), G. S. Haslam (N. J. Zinc Co.), and D. E. Jones (American Hard Rubber Co.). The Nominating Committee was headed by Sam Martin (Thiokol) as chairman, and included Joseph Breckley (Titanium Pigment) and G. H. Provost (U. S. Rubber).

Approximately 540 members and guests attended the combined meeting and party. During the proceedings it was announced that the paid membership had reached a record total of 911 during the year. Outside of the election and a few brief announcements, the entire evening was devoted to fun and frolic. A program of entertainment, featuring a number of variety acts, was well received by the audience. Following the entertainment, some 100 prizes were distributed to holders of lucky number tickets. The prizes were made possible by donations received from the following companies:

Advance Solvents & Chemical Corp., Akron Standard Mold Co., L. Albert & Son, Aluminum Flake Co., American Cyanamid Co., American Zinc Sales Co., J. T. Baker Chemical Co., Barrett Div., Allied Chemical & Dye Corp., Binney & Smith Co., Black Rock Manufacturing Co., Stewart Bolling & Co., Brooklyn Color Works, Godfrey L. Cabot, Inc., John H. Calo Co., Caldwell Co., Carter Bell Mfg. Co., Cleveland Liner & Mfg. Co., Container Co., Continental Carbon Co., Continental-Mexican Rubber Co., Cooke Color & Chemical Co., E. I. du Pont de Nemours & Co., Farrel-Birmingham Co., Flintkote Co., General Atlas Carbon Co., General Latex & Chemical Co., General Magnesite & Magnesia Co., B. F. Goodrich Chemical Co.

Also C. P. Hall Co., Hardesty Chemical Co., Herron Bros. & Meyer, J. M. Huber, Inc., *India Rubber World*, I. B. Kleinert Rubber Co., Meyer & Brown Corp., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., Moore & Munger, H. Muehlstein & Co., National Sherardizing & Machine Co., Naugatuck Chemical, Neville Co., New Jersey Zinc Co., Pennsylvania Industrial Chemical Corp., Pequanoc Rubber Co., Phillips Petroleum Co., Rare Metal Products Co., Revertex Corp. of America, H. M. Royal, Inc., RUBBER AGE.

Also St. Joseph Lead Co., A. Schrader's Son, A. Schulman, Inc., Scott Testers, Inc., Sharples Chemicals, Inc., Shell Oil Co., Southeastern Clay Co., Speed Products Co., Stamford Rubber Supply Co., Stanco Distributors, Inc., Standard Chemical Co., Stauffer Chemical Co., Sun Oil Co., Tanney-Costello, Inc., Textile Proofers, Inc., Thiokol Corp., Thompson, Weinman & Co., Wm. R. Thropp & Sons Co., Titanium Pigment Corp., United Carbon Co., U. S. Rubber Reclaiming Co., R. T. Vanderbilt Co., Vansul & Co., J. J. White Products Co., C. K. Williams & Co., Wilmington Chemical Corp., Witco Chemical Co.

Greenup Heads R. I. Group

H. W. Greenup, of the Pilgrim Latex Thread Co., Fall River, Mass., has been named president of the Rhode Island Rubber Club for the coming year. At a meeting held on November 14, at the Crown Hotel in Providence, R. I., both Mr. Greenup and Frank Springer, of the Davol Rubber Co., were candidates for the position, and Mr. Springer was elected president by a close margin. Subsequently, at a meeting of the Executive Committee of the Group, Mr. Springer resigned and by a unanimous vote of the committee Mr. Greenup was chosen to fill the office of president for 1947. At the meeting, Howard T. Fulton, of the Kleistone Rubber Co., Warren, R. I., was elected secretary-treasurer, and the following were elected as members of the Executive Committee: S. I. Strickhouser, F. J. Lake, D. C. Scott, Jr., F. S. Bartlett, M. J. Linn, C. F. Hoover, F. H. Springer, L. T. Wilson, and H. E. Murch. Approximately 65 members and guests attended the meeting, which heard an address on "Some Aspects of the Russian Situation" by Lex King Souter.

Division to Meet in Cleveland

It has been officially announced that the Division of Rubber Chemistry, A.C.S., will hold its Spring Meeting on Monday, Tuesday and Wednesday, May 26, 27 and 28, in Cleveland, Ohio. Headquarters for the Division will be maintained at the Hotel Cleveland. The customary banquet will be held on Tuesday evening, May 27, at some as yet undesignated hotel. A. I. Brandt, general sales manager of the B. F. Goodrich Chemical Co., is general chairman of the meeting.

Planning Seiberling Memorial

A living memorial to the late C. W. Seiberling, formerly first vice-president of the Seiberling Rubber Co., is being planned by a group of citizens in Akron. Howard L. Hyde, general counsel of the Goodyear Tire & Rubber Co., has been named chairman of the C. W. Seiberling Memorial Committee, which has assumed the job of deciding on the type of memorial to be built and then completing it. A goal of $500,000 has been set.

REYNOLDS, PATRICK, CAPEN HEAD BOSTON RUBBER GROUP

The election of officers was one of the features of the Winter Meeting and Annual Christmas Party of the Boston Rubber Group, held on December 6 at the Copley Plaza Hotel in Boston, Mass. The following officers were named: *Chairman*, Charles E. Reynolds (Cambridge Rubber); *Vice-Chairman*, Richard K. Patrick (Vulplex); *Secretary-Treasurer*, Bernard H. Capen (Tyer Rubber). In addition, Owen Brown (Cabot) and Harry Sutton (Boston Woven Hose) were elected members of the Executive Committee. James R. Geenty (Goodall-Sanford), the retiring chairman, automatically becomes a member of that committee.

During the business session of the meeting, which was attended by over 500 members and guests, Mr. Patrick, secretary-treasurer for the current year, reported that the group's funds as of December 1, 1946, amounted to $1,851. Paid membership was reported at 685. A special referendum vote resulted in the decision to raise dues from the present $1.00 to $2.00 per year. Consideration to the choice of holding meetings in the late afternoon, as some local rubber groups now do, or in the evening as in the past, resulted in an overwhelming decision to continue holding the meetings in the evening.

The featured speaker for the evening was Dr. John Shackleton, of the Technical Service Division, Plastics Department, E. I. du Pont de Nemours & Co. Discussing "Polyethylene," with which he has been connected since its introduction in this country, Dr. Shackleton briefly traced its development by Imperial Chemical Industries in England and told of some of its uses during the war, particularly its applications in high frequency cable for radar and, later, coaxial cable.

The speaker also discussed some of the newer uses of this new type plastic, including applications in packaging and tank linings. The manufacture of Polyethylene films was constantly expanding, he stated, with films as thin as 2 to 4 mils now being commercially produced.

In concluding his talk, Dr. Shackleton outlined the properties of Polyethylene, including impact strength, water absorption, moistureproofness, chemical resistance, and electrical properties, and compared each of these properties with those of other plastic materials. The rigidity of the material, he said, was midway between the rigid and non-rigid plastics.

The meeting was concluded with the presentation of an excellent stage show and the distribution of prizes, consisting of bottles of liquor, to holders of lucky number tickets.

Seats with Airfoam cushioning will soon be installed in the press box and most sections of the Yankee Stadium in New York City.

SMITH YEAR-END STATEMENT SEES CONTINUED SHORTAGES

Although the rubber industry produced a record peacetime volume of goods in 1946 and is expected to repeat this performance, or better it, in 1947, the pent-up demand for rubber products is such that shortages will continue for many months, according to a year-end statement issued by Herbert E. Smith, president of the U. S. Rubber Co. Highlights of Mr. Smith's statement follow herewith:

Indications are that final sales figures will show that the industry in 1946 produced goods valued at $2.3 billion, which was more than double the volume of 1940, the previous record year of wholly peacetime output. It is estimated that sales in 1947 will be $2.3 to $2.5 billion.

The demand for tires is still greater than the supply and dealers find it impossible to build up inventories. This situation will probably continue during the first 3 to 6 months of 1947 but during the second half supply is expected to be more adequate.

Rubber footwear, both waterproof and canvas, is being produced in increasingly large quantities but it will be some months before depleted retail stocks are brought up to normal levels.

The demand for rubber clothing and coated fabrics will continue to exceed supply for many months. The supply of golf balls and bathing caps will remain tight, although these articles will appear in much larger numbers than in 1946. Lastex yarn will be short in the first part of the year, but will be more plentiful in the latter half. Industrial products such as belting and hose, for which demand still far exceeds supply, probably will be short all year.

In 1947, for the first time in four years, the industry will use more natural rubber than synthetic. Consumption of natural is expected to be about 51 per cent of the total. This compares with 22 per cent in 1946.

Total consumption of rubber by the United States in 1947 is estimated at 980,000 tons, of which 502,000 tons will be natural and 478,000 tons various kinds of synthetic rubber. Consumption in this country in 1946 was slightly over one million tons.

The greater part of the 1947 tonnage will go into tires, which will be manufactured in almost as great quantities as in 1946, when output reached record proportions. In that year, 88 million units, of which 66 million were passenger car tires, were expected to be produced. The 1947 forecast is for a total of 80 million units, with 62 million for passenger cars.

A new edition of the booklet entitled "Facts and Figures About Atlanta" has been made available by the Industrial Bureau of the Atlanta Chamber of Commerce, Atlanta, Ga. The booklet contains statistics which reflect the development of the city through 1945.

Appointed Technical Director

A. C. Simon

A. C. Simon, chief chemist of the Firestone Industrial Products Co., Noblesville, Ind., for the past nine years, has been appointed technical director of the H. O. Canfield Co., Bridgeport, Conn. In his new post, Mr. Simon will direct the company's program of contemplated technological improvements of existing products, as well as new additions to its line of mechanical rubber goods.

Ontario Group Hears Schoenfeld

Dr. Frank K. Schoenfeld, technical director of the B. F. Goodrich Chemical Co., Cleveland, Ohio, was the principal speaker at the joint meeting of the Ontario Rubber Section and Wellington-Waterloo Section of the Chemical Institute of Canada, held at the Walper House, Kitchener, Ontario, on November 14. The meeting was preceded by a visit to the Naugatuck Chemical plant at Elmira, Ontario. In a talk on "American Rubbers," Dr. Schoenfeld said that better synthetic rubbers than those now available have been produced, but will not be marketed until the proper processing equipment has been developed. Comparing natural and synthetic rubber, he stated that GR-S is better in passenger car tires, but inferior in truck and bus tires. The speaker concluded with a discussion of his company's products, declaring that when Hycar and polyvinyl chloride are mixed, a non-bleeding compound is obtained which outwears leather 12 to 1, while a mixture of phenolic resins and Hycar results in a product with wear resistance superior to leather. Dr. Schoenfeld also revealed that a new Goodrich product, a saturated chemical with rubber-like properties, requiring no vulcanization, and no anti-oxidants, and which will withstand heat up to 300° F., will soon be available.

BRITISH TIRE OUTPUT SET AT NEARLY 80,000,000 FOR WAR

According to a report in a recent issue of *Foreign Commerce Weekly*, Great Britain's tire industry produced nearly 80,000,000 tires during the war. Of the total, 47,167,747 were bicycle tires and 32,693,748 were heavy tires, including 10,365,516 automobile tires, 13,761,903 giant tires, 823,089 land and tractor tires, approximately 150,000 solid tires, and 2,234,000 motorcycle tires.

During 1940 and 1941, the British tire industry used 97.75% natural rubber, 2% reclaimed rubber, and the remainder crumb rubber. By the time synthetic rubber came into adequate supply, the proportion of reclaim to new rubber used had risen as high as 65%. By the end of 1943, use of synthetic rubber amounted to 16% of all the new rubber used for tires in Great Britain, and when the war ended it amounted to 72.5%.

The British were reported to have found that casings of rayon were better than cotton in withstanding the greater heat generated by synthetic rubber. As a result, use of rayon in tires which stood at 0.7%, as compared with 99.3% for cotton in the early days of the war, rose to 34.1%, against 65.9% for cotton, at war's end.

Preview Firestone Films

A special preview of two new sound movies, one on "The Building of a Tire," prepared by the Walt Disney Studios, and the other on "The 1946 Indianapolis Race," was given by the Firestone Tire & Rubber Co. to members of the press and other guests at the Ritz-Carlton Hotel in New York City on November 20. Both well executed films, they are available from the company for showing before rubber and other interested groups.

Philadelphia Meets January 10

The next meeting of the Philadelphia Rubber Group will be held on Friday, January 10, at Kugler's Restaurant in Philadelphia, Penna. T. L. Williams, of the Rayon Division of E. I. du Pont de Nemours & Co., Inc., will speak on "Properties and Uses of Rayon." Tickets for the meeting and dinner are $3.50 each, and can be secured in advance from William Dunlap, Jr., c/o Lee Tire & Rubber Co., Conshohocken, Penna.

Buys Plant in St. Louis

General Cable Corp. has announced the purchase from the War Assets Administration of the plant, which it operated for the government during the war, in St. Louis, Mo. The company also announced recently the sale of its Pawtucket, R. I., plant, as reported elsewhere in this issue, and its Buffalo, N. Y., plant. It is also reported to be negotiating for the sale of its Rome, N. Y., plant.

TALKS ON BACKRINDING AND LATEX FEATURE MEETING OF AKRON GROUP

One of the largest crowds ever attending a meeting of the group, well over 400 members and guests, put in an appearance at the Fall Meeting of the Akron Rubber Group, held on November 22 at the Mayflower Hotel in Akron, Ohio. The meeting was "sponsored" by the Rubber Chemicals Division of E. I. du Pont de Nemours & Co. in connection with the formal opening of its new rubber laboratory, located at 40 East Buchtel Avenue in Akron. A special cocktail party, given by the Akron Branch of the DuPont Rubber Chemicals Division, preceded the meeting.

A brief business session was held, conducted by Jack R. Moore (Standard Chemical), chairman of the group. Mr. Moore pointed out that although the group charged no membership dues, it was anxious to bring its mailing list up to date, and he urged all members of the industry who wish to receive notices of meetings to so advise the secretary, Dr. Henry F. Palmer, 519 Mineola Ave., Akron 2, Ohio. He also announced that meetings of the group have been scheduled for February 1 and May 9 of next year.

Mr. Moore also appointed Ralph Appleby (DuPont) as chairman of the Program Committee, to be assisted by J. Fielding (Goodyear), H. Ebright (Firestone), and H. Catt (Goodrich). R. H. Crossley (Caldwell Co.) and J. Kerscher (Goodyear) were named members of the Publicity Committee. It was announced that Walter Krantz (Goodyear) and Earl Busenburg (Goodrich) had been elected members of the Executive Committee.

Pointing out that although the Akron group had been in existence for many years it had no formal constitution, the chairman stated that a special committee has been named to draw up such a constitution for approval by the group in the near future. This committee consists of R. Yohe (American Anode), A. E. Sidnell (Seiberling Latex), W. W. Vogt (Goodyear), and S. Kuykendahl (Firestone). Dr. Palmer, secretary of the group, reported that as of November 20, the group had a surplus of $466.

Mr. Moore then introduced Harry E. Outcault (St. Joseph Lead), who is vice-chairman of the ACS Rubber Division and who acts as liaison officer between the Division and the local rubber groups. Mr. Outcault, in a brief address, outlined the method to be used by the Division in cooperating with the local groups and stated that because of its position in the industry the Akron group would be looked up to as a model for the other groups. He also advised that the next meeting of the Rubber Division will be held in Cleveland next May and the Fall Meeting in New York in September.

Bridgwater Lauds Industry

The meeting was then turned over to DuPont, with the opening address made by E. R. Bridgwater, manager of the DuPont Rubber Chemicals Division. Reminding his listeners that it was just about 15 years ago that the development of neoprene, then called DuPrene, was first revealed to industry at a meeting of the Akron Section of the American Chemical Society, Mr. Bridgwater lauded the rubber manufacturing industry for not merely being content "to utilize wherever possible developments brought to it by the chemical industry" but also for making "generous appropriations of its own funds for research in the fields of chemistry and other physical sciences."

Mr. Bridgwater also stated that it was a pleasure for the chemical industry in general and DuPont in particular "to work with an industry that shows such a keen appreciation of the benefits that are attainable by the application of chemical science to its problems and such an aggressive determination to leave no stone unturned to improve the quality of its products and reduce their cost to the consuming public." One reason for the establishment of the new Akron laboratory, he said, was to enable DuPont to better perform its part in the attainment of that objective. Mr. Bridgwater then introduced the technical speakers of the evening.

Stangor on Backrinding

E. L. Stangor, who is in charge of the compounding of dry rubber, neoprene, and other synthetic rubbers in DuPont's new Akron Rubber Laboratory, discussed the "Backrinding of Molded Products." An abstract of that paper follows herewith:

Defects in molded rubber products have always been a source of annoyance and loss to manufacturers of rubber goods. One of these which occurs with distressing frequency is known as backrinding. Backrinding is the term used to indicate the torn or gouged condition which occasionally appears at or near the mold parting line on a vulcanized article.

Studies made in the laboratory indicate that backrinding is caused by the sudden release of internal pressure resulting from the thermal expansion of the compound during its rise to curing temperature. When the mold is opened, the internal pressure forces the vulcanized compound past the sharp edges of the parting line of the mold and results in a torn or gouged finished article.

Several factors influence backrinding. The use of an excessive amount of compound in relation to the mold cavity may result in backrinding. The elastomer content and the type of filler used have definite effects. Increasing the content of inert filler in the composition tends to decrease backrinding. Some fillers have lower thermal expansion than others and their use, if practical, will minimize backrinding.

Curing at lower temperatures or preheating the unvulcanized stock produces less thermal expansion, and hence is favorable to the control of backrinding. Cooling the mold under pressure completely eliminates it. Press pressure has no effect but must, of course, be high enough to keep the mold tightly closed throughout the cure.

Manufacturers of molded articles can solve most backrinding problems by bearing in mind that the mold should be designed to avoid localized distortion of the article when the mold is opened at the end of the cure.

The design of molds is best done by the rubber manufacturer who knows the requirements of rubber molds and can design them in a manner to produce fewer defective products which in turn results in lower costs to the consumer.—End of abstract.

(EDITOR'S NOTE: Mr. Stangor's paper will be reproduced in an early issue of RUBBER AGE.)

Mighton Discusses Latex Outlets

Dr. Charles J. Mighton, manager of the new DuPont Rubber Laboratory, then delivered a talk on "New Outlets for Rubber through Latex." An abstract of Dr. Mighton's paper follows herewith:

The rapid growth of rubber manufacturing processes involving the use of natural and synthetic rubber latex is one of the most interesting developments of recent years.

Prior to 1920 practically all manufacturing processes for making rubber goods started with the use of coagulated rubber and latex was practically unknown except in rubber-producing countries. In the early 20's, latex was adopted to a limited extent for the manufacture of dipped goods, for proofings, or saturating and for some adhesives. These and many new applications developed rapidly during the next few years and the use of latex increased from about 5 million pounds per year in 1924 to an estimated 110 million pounds in 1946.

A large proportion of this increase represented an expansion of the market for rubber goods. Perhaps the most outstanding example of a new product and an expanded market is that of foam sponge for cushioning of all kinds. Hand in hand with this material came the development of latex-bonded fibers for the same purpose. Both foam sponge and bonded fibers are competing with and displacing conventional spring constructions.

In the period immediately following 1940, the development of synthetic latices was stimulated by the impending shortage of natural latex. During the war period newly developed synthetic latices of necessity replaced the natural product in practically all applications and it was found that many products made from synthetic latex had advantages over those made from the natural product.

The advent of synthetics has enabled rubber processors to offer their customers products having better aging properties, heat resistance, oil resistance, and sunlight resistance, than they could furnish if natural rubber were the only available elastomer and strengthen their competi-

tive position with respect to other materials of construction. Synthetic latices, like dry polymers, offer advantage in finished product quality and in addition may be so tailored as to enable the processor to use fabricating methods that would not be adaptable to the natural product.

For example, synthetic latices can be made with a lower content of electrolytes and other non-rubber constituents than natural latex, the particles can be either positively or negatively charged, the surface tension can be varied over wide limits, and so can the particle size.

Manufacturers of synthetic latices have thus far been pretty well absorbed with problems having to do with volume and uniformity of production and have not had an opportunity to discover how far they can go in the direction of producing tailor-made latices to suit specific fabricating requirements.

Also, there has been little done thus far in the direction of producing reinforcing pigments and other compounding ingredients designed specifically for latex uses. Most of the compounding ingredients that have been used in the past in latex have merely been water dispersions of conventional dry rubber compounding ingredients.

Research on synthetic elastomers and latex has already reached the stage where new molecule building is almost a daily occurrence. Many of these new elastomers and latices will mean additional new business for our industry and more interesting jobs for all of us.—End of abstract.

Booklet on Synthetic Rubber

"Five Years of Synthetic Rubber" is the title of a new booklet, issued recently by the U. S. Rubber Co., which shows the growth of the synthetic rubber industry and gives an appraisal of its importance today in the manufacture of rubber products. The various types of synthetic rubber are identified and described in considerable detail and an impartial analysis of their properties is furnished. For the chemistry student, a technical appendix is included which gives the chemical structure of rubber and the synthetic rubbers, and a useful glossary of terms used in the industry is added. The booklet may be obtained by addressing a request to the Publicity Department, U. S. Rubber Co., Rockefeller Center, New York 20, N. Y.

Standard Chemical Changes Name

The name of the Standard Chemical Co., Akron Savings & Loan Building, Akron 8, Ohio, has been changed to the Harwick Standard Chemical Co. It was emphasized that the change was in name only and no change in products, policies or management is contemplated. The company has branches in Boston, Chicago, Trenton and Los Angeles. C. J. Harwick is general manager of the firm.

Goodyear Opens Havana Plant

Production has been started at the new plant of the Goodyear Tire & Rubber Co. near Havana, Cuba. Built in the middle of a 14-acre orange grove, the new plant is producing popular size tires and tubes, repair materials and rubber heels for the Cuban market. The Goodyear personnel at the Cuban plant is headed by Richard P. Morgan, vice-president and general manager; Marvin A. Ryan, vice-president in charge of production, and Eugene Riveroll, treasurer. Goodyear now has factories in 12 foreign countries.

Additional Navy Specification

An additional specification on rubber has been issued by the Bureau of Ships of the Navy Department since our last report. A copy of the specification may be secured by addressing a request to the Navy Department, Bureau of Supplies and Accounts, Washington 25, D. C. The specification follows:

Navy Dept. Spec. 33H7d (Amending Navy Dept. Spec. 33H7c of March 1, 1944)—Hose, Cutting and Welding (Acetylene-Hydrogen, Oxygen-Air), October 15, 1946.

Hewitt Heads Essex Rubber

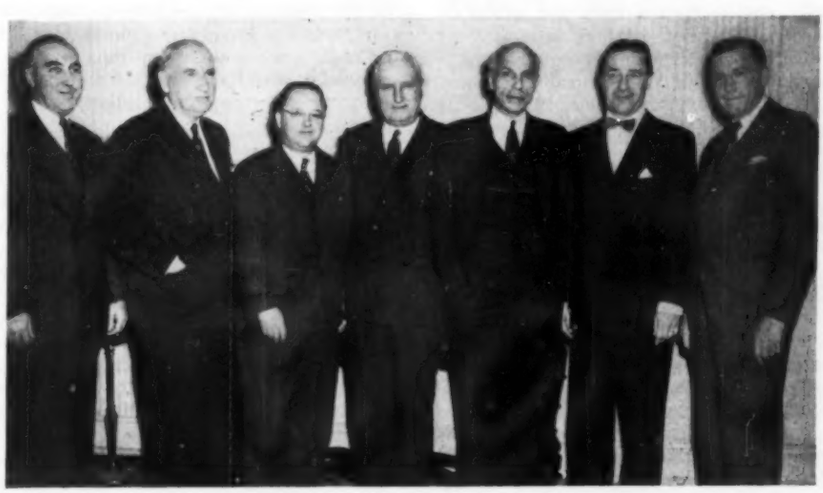
At a recent stockholders meeting of the Essex Rubber Co., Trenton 3, N. J., Joseph R. Hewitt, executive vice-president of the company for several years, was elected president, and Joseph E. Cox, formerly vice-president of the Windsor Manufacturing Co., a subsidiary of the Goodyear Tire & Rubber Co., was named vice-president and a director of the company. Owen Moon, Jr., formerly president of Essex, has been appointed chairman of the board of directors.

OFFICIAL WELCOME EXTENDED TO DUPONT'S NEW LABORATORY

An official welcome to the new rubber laboratory of the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., formally opened on November 22, was extended to that company in the form of a luncheon given by the Akron Chamber of Commerce at the Mayflower Hotel in Akron on the same day. The new laboratory is located at 40 East Buchtel Avenue, at High Street. The welcoming address was given by John Thorpe, president of the chamber, and was acknowledged by Walter S. Carpenter, Jr., president of the DuPont company.

In an informal talk, Mr. Carpenter expressed some opinions of world conditions, particularly those currently existing in Europe, formed as the result of a recent trip abroad. He emphasized the fact that under "socialistic" philosophies, in whatever land adopted, only a few have prescribed the work of many, and these few have "enjoyed or disposed of the meager results." He expressed the belief that we have no need nor room in the United States "for desperate, alien, economic philosophies."

The luncheon was attended by a selected group, representing Akron's outstanding industries. Those sitting at the speakers' table included Lynn Holcomb, managing editor, *Akron Beacon Journal;* W. O'Neil, president, General Tire & Rubber Co.; J. J. Newman, vice-president, B. F. Goodrich Co.; J. W. Thomas, chairman of the board, Firestone Tire & Rubber Co.; Dr. R. P. Dinsmore, vice-president, Goodyear Tire & Rubber Co.; J. P. Seiberling, president, Seiberling Rubber Co.; and Vince Johnson, Executive Vice-President, Akron Chamber of Commerce.



Among those present at the luncheon in Akron on the formal opening of the Du Pont rubber laboratory were, left to right: John A. Thorpe, president of the Akron Chamber of Commerce; William O'Neil, president of the General Tire & Rubber Co.; J. P. Seiberling, president of the Seiberling Rubber Co.; J. W. Thomas, chairman of the board of the Firestone Tire & Rubber Co.; W. S. Carpenter, Jr., president of Du Pont; J. J. Newman, vice-president of the B. F. Goodrich Co.; and Dr. R. P. Dinsmore, vice-president of Goodyear.

ASME RUBBER-PLASTICS GROUP HOLDS ITS ANNUAL MEETING

The Rubber and Plastics Division of the American Society of Mechanical Engineers held its annual meeting on December 2 at the Hotel Pennsylvania in New York City in conjunction with the 67th Annual Meeting of the parent society. Approximately 60 members and guests were in attendance.

Henry Richardson, of DeBell & Richardson, Springfield, Mass., was elected chairman of the Division for 1947, and D. H. Cornell, Jr., of the B. F. Goodrich Co., Akron, Ohio, was named secretary. Mr. Cornell functioned as Chairman of the Papers Committee during the past year. J. F. Downie Smith (United Shoe Machinery Co.) was reappointed as research secretary. W. Newlin Keen (Du Pont) was elected as a member of the executive committee and will also act as Chairman of the Papers Committee for 1947. M. E. Lerner (RUBBER AGE) was named to handle publicity for the Division.

Separate sessions on rubber and plastics were held by the Division at its meeting, that on rubber being held in the morning and the one on plastics in the evening. Four papers were presented at each session. Dr. Sidney M. Cadwell (U. S. Rubber) acted as chairman at the rubber session and George F. Nordenholt (*Product Engineering*) for the plastic session.

Papers at Rubber Session

The first paper at the rubber session was on "Practical Aspects of the Design of Structural Rubber Products," by Edward E. Blaurock, chief engineer, motor products division, U. S. Rubber Co., Detroit, Mich. Mr. Blaurock gave details which are required to produce a low-cost, high-quality article compatible with production materials and processes. He covered manufacturing, cost and performance considerations as they were affected by such items as metal design and specifications, design of integral bolts and nuts, metal tolerances, etc., as well as general manufacturing practices.

A paper on "A Simplified Method for the Design of Vibration Isolating Suspensions," prepared by R. C. Lewis, research engineer, Aero-Elastic Laboratory, M.I.T., Cambridge, Mass., and Karl Unholtz, research engineer, M-B Mfg. Co., New Haven, Conn., was given by Mr. Lewis. The paper covered a new type of chart treating of coupled natural frequencies of suspended bodies showing frequency ratios, nodal positions, and optimum selection of ratios directly in terms of physical dimensions of body to be mounted. Characteristics of a newly-designed family of isolator units were described.

"Laboratory Testing of Rubber Torsion Springs" was the title of the next paper, prepared by D. H. Cornell and J. R. Beatty, of the Physical Research Laboratory, B. F. Goodrich Co., Akron, Ohio, and presented by Mr. Cornell. Results of laboratory tests performed to establish the load deflection modulus, creep, and fatigue properties of rubber torsion springs were given, as well as the effect of temperature on all of these properties. Development of special test methods for these investigations was also described. (EDITOR'S NOTE: This paper will be reproduced in an early issue of RUBBER AGE.)

The final paper at the rubber session was a report on "Advances in Rubber During 1946," compiled by E. F. Riesing and J. O. Callouette, of the Firestone Industrial Products Co., Detroit, Mich., which was delivered by Mr. Reising, and which highlighted developments during the past year. (EDITOR'S NOTE: This report is reproduced elsewhere in this issue.)

Papers at Plastics Session

Three technical papers and a report on "Advances in Plastics During 1946" were given at the plastics session, held in the evening. The papers were: *Mechanical Precision in Molded Plastic Parts,* by S. K. Moxness, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.; *Chemical Resistance of Phenolic Laminates,* by W. R. Tyrie, General Electric Co., West Lynn, Mass.; and *Creep, Long-Time Tensile, and Flexural Fatigue Properties of Melamine and Phenolic Plastic Materials,* by David Telfair, Earlham College, Richmond, Ind., and C. H. Adams and H. W. Mohrman, Monsanto Chemical Co., Springfield, Mass.

The report on advances in plastics during the past year was given by Henry M. Richardson, the newly-elected chairman. According to Mr. Richardson the principal features of the industry during 1946 were the consolidation of developments made during the war years and their adaption to peacetime uses. With regard to equipment and engineering, one of the most notable advances made, he said, was the broad and general adoption of high speed transfer molding of thermosetting materials with the aid of high frequency electronic preheating.

Glancy Succeeds Glidden

Warren E. Glancy, director of laboratories of the Hood Rubber Co., Watertown 72, Mass., has been appointed manager of development by the company, succeeding Alfred A. Glidden, who has retired after being associated with Hood for nearly 50 years. Mr. Glancy was graduated from the Massachusetts Institute of Technology, where he majored in chemical engineering, in 1913. He joined the Hood laboratories two years later and, except for the year 1918 when he was with the Chemical Warfare Service, he has served the company successively as tire chemist, chief chemist, and director of laboratories. Mr. Glancy has been a member of the executive committee of the Division of Rubber Chemistry, A.C.S., and is a past chairman of the Boston Rubber Group.

PEAK PASSENGER TIRE OUTPUT EXPECTED TO LAST INTO 1947

Peak passenger tire production, expected to fall off at the end of the year, will continue well into 1947, according to a recent statement made in Akron by R. S. Wilson, vice-president of sales for the Goodyear Tire & Rubber Co., Akron, and last of the wartime "rubber czars." Estimates made within the rubber industry last spring on the time required to bring supply and demand for passenger car tires into balance appear to have missed by almost six months, Mr. Wilson admitted.

"Even though we have produced tires at peak capacity it now appears we underestimated the backlog of pent-up demand," he stated. "We knew that the travel hunger of the public would be tremendous following the war but much more tire rubber was consumed in vacation travel than we had allowed for in earlier calculations."

Passenger tire output may catch up during the second quarter of 1947 along with the production of small truck tires provided there is no shortage of materials, Mr. Wilson added. There have been numerous occasions this year when tire manufacture was on the brink of stoppage due to insufficient supplies of raw products. The situation still is touch-and-go on as many as 13 items among those required in the building of a tire. Any slowing up in production will further put off the day when supply and demand balance.

To Open South African Plant

Goodyear Tire & Rubber Co. has announced that production at its new tire, tube, and mechanical goods plant in Uitenage, South Africa, is due to start in January. The main factory of the South African plant is 900 feet long, housing tire and tube manufacturing facilities. A separate mechanical goods unit measures 300 by 100 feet. Employing about 500 persons at first, the plant will produce chiefly for the South African market. V. L. Follo, who has been in charge of production at Plant D of the Goodyear Aircraft Corp., Akron, since 1942, has been appointed general superintendent of the Uitenage factory.

SAE Plans Annual Meeting

The annual meeting of the Society of Automotive Engineers is scheduled to be held at the Book-Cadillac Hotel in Detroit, Mich., from January 6 to 10. Included among the papers to be presented at the five-day meeting are the following: *Automotive Adhesives and Sealers,* by A. J. Carter, of the Chrysler Corp., Detroit, Mich.; *Modern Plastics as Applied to Automotive Transportation,* by F. B. Stanley, of *Modern Plastics,* 122 East 42nd St., New York 17, N. Y.; and *Tire and Rubber Situation,* by J. E. Hale, of the Firestone Tire & Rubber Co., Akron.

CONGRESSIONAL ACTION URGED TO SAVE SYNTHETIC INDUSTRY

Discussing "Prospects for the Synthetic Rubber Industry," at a meeting of the American Institute of Chemical Engineers, held in Charleston, W. Va., on November 22, Dr. R. P. Dinsmore, vice-president in charge of research and development of the Goodyear Tire & Rubber Co., Akron, declared that prompt action by Congress is needed to save the American synthetic rubber industry from destruction, a catastrophe that will retard chemical progress, impair national security, and cost the nation millions of dollars in increased prices for crude natural rubber.

A return to unrestrained competitive bidding for natural rubber, if coupled with unwise advertising campaigns regarding the relative merits of natural and synthetic rubber, will wreck the synthetic rubber industry, Dr. Dinsmore predicted. Reminding his listeners that a rise of one cent per pound in the average cost of rubber will cost the nation $22,400,000 a year, he urged that Congress adopt an integrated rubber program that would continue government purchase of natural rubber as long as a shortage exists and which would assure for the time being the use of a minimum amount of synthetic rubber preferably by product specification.

Dr. Dinsmore pointed out that it was necessary to consider the role of synthetic rubber from the standpoint of economic protection of the American public, national security, and chemical progress. He quoted statistics to show that the estimated rubber consumption in the United States for next year would be 980,000 tons, whereas world production of natural rubber is expected to be between 900,000 and 1,000,000 tons. Of this natural rubber, he said, the United States can only expect to get a maximum of 720,000 tons, while it is further expected that 150,000 tons of this may be placed in the national military stockpile. From these figures, Dr. Dinsmore pointed out, it is evident that with our rubber demand about equal to the total world production of natural rubber, our natural rubber consumption can only be about 60 to 70% of our total.

Rubber Restriction Plans

Presenting statistics to illustrate the need of protecting the public against unreasonable fluctuations in the price of natural rubber, the speaker pointed out that the price of crude rubber started to climb in 1922 when the British adopted the so-called Stevenson Restriction Plan. When it was abandoned in 1928, prices fell. He recalled that after the early years of the depression which started in 1929, the British and Dutch in June, 1934, collaborated on another restriction plan called International Rubber Regulation. Although this scheme was said to have been nullified by the entrance of the United States into World War II, it nominally stayed in effect until June, 1944. These two plans were cited as examples which show clearly that we cannot expect competitive bidding for our natural rubber business, and which indicate that we must expect collaboration to raise prices.

Dr. Dinsmore asserted that it is perfectly logical that business people should endorse and prefer private initiative and free enterprise. It is not always sensible, however, to pit private initiative against international government monopoly without being certain that conditions offer at least an even chance of success.

Coming Events

Jan. 10. Philadelphia Rubber Group, Kugler's Restaurant, Philadelphia, Penna.

Jan. 30. Northern California Rubber Group, Oakland, Calif.

Feb. 1. Akron Rubber Group, Hotel Mayflower, Akron, Ohio.

Feb. 14. Connecticut Rubber Group.

Feb. 20. Southern Ohio Rubber Group, Dayton, Ohio. (Tentative).

Feb. 24-28. A.S.T.M., Spring Meeting and Committee Week, Hotel Benjamin Franklin, Philadelphia, Pa.

Apr. 14-18. A.C.S., 111th Meeting, Atlantic City, N. J.

May 9. Akron Rubber Group, Hotel Mayflower, Akron, Ohio.

May 9. Connecticut Rubber Group.

May 26-28. Rubber Division, A.C.S., Spring Meeting, Hotel Cleveland, Cleveland, Ohio.

June 16-20. A.S.T.M., Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

Sept. 15-19. A.C.S., 112th Meeting, New York City.

Killian and Shunk Firms Sold

The entire outstanding capital stock of the Killian Manufacturing Co., L. E. Shunk Latex Products, Inc., and the Killashun Sales Division, Inc., all of Akron, has been acquired by the National Hygienic Products Corp., New York City, for an undisclosed sum. David A. Buckley, Jr., president of National Hygienic Products, will also serve as president of the three Akron companies. Other officers include Bruce Osborne, vice-president; William E. Buckley, secretary and treasurer; Martin Aaronson, controller; and Mrs. Lucille Schaeffer, Robert M. Woodward and Robert H. Walsh, assistant secretaries and assistant treasurers. George L. Winder, formerly production manager at the Akron plant of American Anode, Inc., has been named general production manager. Outside of the retirement of James L. Tyrrell, Charles E. Jenkins, and Maurice Gusman, former owners, no other changes in management personnel were made.

BUREAU OF STANDARDS STARTS HIGH POLYMER LECTURE SERIES

A new series of lectures dealing with the chemistry and physics of high polymers has been inaugurated by the National Bureau of Standards at its Chemistry Building in Washington, D. C. The lectures, arranged by Dr. Robert Simha, of the Bureau's Division of Organic and Fibrous Materials, are open to the public without charge, and will be held from 7 to 9 p.m. in Room 214. The lectures, which continue the seminar presented last year, will be given by the nation's leading scientists in the polymer field from industry and universities.

The program of twelve lectures, the first two of which already have been delivered, consists of the following:

November 22: "Theories of Fractional Precipitation of High Polymers as Applied to Cellulose Esters," D. R. Morey, Eastman Kodak Company.

December 13: "Visco-Elastic Properties of Polymer Solutions," J. D. Ferry, University of Wisconsin.

January 22: "On Quantum Mechanisms of a Macroscopic Scale," F. W. London, Duke University.

January 30: "Applications of Magneto-chemistry to Polymers and Polymerization," P. W. Selwood, Northwestern University.

February 27: "Physical Chemistry of Collagen," J. H. Highberger, General Dyestuff Corporation

March 6: "Solution Properties of Cellulose Derivatives—Correlation with Physical Properties," H. M. Spurlin, Hercules Powder Company.

March 28: "Effects of Low Temperature on High Elasticity of Rubbers," S. D. Gehman, Goodyear Tire and Rubber Company.

April 24: "Elasticity and Plasticity of High Polymers," H. Leaderman, Firestone Tire and Rubber Company.

May 8: "Electrical Properties of Polymers," R. M. Fuoss, Yale University.

May 29: "Polar Coordination in Solid Polymers," W. O. Baker, Bell Telephone Laboratories.

June 5: "Optical Investigations on Polymers," W. Heller, Wayne University.

June 12: "Discoloration of Polymers," R. F. Boyer, Dow Chemical Company.

Plan Latex Bulking Plant

Construction of a bulking plant for latex at a cost of approximately $500,000, located at either Singapore or Port Swettenham, is being planned, according to reports from Malaya. Construction of the plant is being encouraged by Latex Distributors, Inc., of New York. Arthur Nolan, vice-president and general manager of the New York firm, recently spent six weeks in the Malayan area making arrangements with several producers and shippers to assure a continuous stream of latex for export to America. Mr. Nolan predicted that the United States would probably purchase between 30,000 and 50,000 tons of latex during 1947.

NAMES IN THE NEWS

L. ALLAN FICKES, until recently associated with the compounding research division of Firestone at Akron, is now laboratory director of the Corduroy Rubber Co., Grand Rapids, Mich.

ROBERT L. HOLMES, attached to the Stratford, Conn., plant of Raybestos-Manhattan, Inc., for some time, was recently transferred to the company's General Asbestos & Rubber Division at North Charleston, S. C.

RIAL S. POTTER, JR., until recently connected with the Essex Rubber Co., Trenton, N. J., is now associated with the Armstrong Rubber Co., West Haven, Conn.

C. OLSON PIKE, formerly associated with the Industrial Tape Corp., New Brunswick, N. J., is now technical director of the Bishop Gutta Percha Co., New York, and the Peters Manufacturing Co., Wollaston, Mass.

DONALD S. VILLARS, associated with the general development department of U. S. Rubber Co. for the past few years, recently left that organization to become head of the science department of the newly-organized Jersey City (N. J.) Junior College.

JOHN L. GILLIS, formerly general export manager and assistant director of the foreign department of the Monsanto Chemical Co., has been appointed head of the foreign department by the company. He succeeds ARNOLD H. SMITH.

DR. R. P. DINSMORE, vice-president in charge of research and development of the Goodyear Tire & Rubber Co., Akron, has been elected a trustee of the Midwest Research Institute, Kansas City, Mo.

CLEMENT D. HUBLER, who has been associated with the Faultless Rubber Co., Ashland, Ohio, since 1907, most recently as executive vice-president, has retired from active duty with the company.

DR. RAYMOND C. BENNER, consulting engineer, and previously director of research of the Carborundum Co., is presently serving in Germany as a consultant on reparations.

LYNN W. YOUNG, who has had many years of experience in the manufacture and sale of Sealz, the highway joint sealing compound produced by Naugatuck Chemical, has been appointed midwest sales representative for this product, with headquarters at 4804 Jefferson St., Kansas City, Mo.

DR. A. H. FAULL, JR., technical superintendent at the Baytown, Texas, synthetic rubber plant, operated by the General Tire & Rubber Co., has been granted a two-year leave of absence by the company to serve as Civilian Director of the Boston Branch of the Scientific Section of the Office of Research and Inventions of the United States Navy.

RALPH B. WOODBURY, formerly manager of purchasing for the Hood Rubber Co., Watertown, Mass., has become associated with James B. Cunningham Co., 248 Boyleston St., Boston, Mass., crude rubber dealers.

EMIL SCHNEDAREK, formerly plant engineer at the Waco, Texas, unit of the General Tire & Rubber Co., and previously project engineer on the company's plant constructions at Caracas, Venezuela, and at Poznan and Debica, Poland, has been named to handle all industrial and engineering purchasing for the company, with headquarters in Akron.

J. A. MARTINO, vice-president of the National Lead Co., 111 Broadway, New York 6, N. Y., and C. F. GARESCHE, head of the company's titanium pigment division, have been appointed executive vice-president and vice-president, respectively.

HUGH BURDETTE, vice-president of the Cabot Carbon Co., Pampa, Texas, and general manager of the southwestern division of Godfrey L. Cabot, Inc., has been elected a director of the Texas Manufacturers Association.

GEORGE J. BURGER, JR., recently discharged from the Army with the rank of major, has resumed his duties with the Burger Tire Consultant Service, 250 W. 57th St., New York 19, N. Y., as editor of the *National Independent*.

R. T. DUNLAP, formerly executive vice-president of the Colorado Fuel & Iron Corp., has been elected president and a director of Great American Industries, Inc., of which the Virginia Rubatex Division, Bedford, Va., is a branch.

NOEL COOK and LOUIS F. GRIESENBECK, both members of the crude rubber purchasing division of the Goodyear Tire & Rubber Co., Akron, have received overseas assignments to Singapore as rubber buyer and manager of the company's Singapore warehouse, respectively.

H. H. GARIS, president of the J. T. Baker Chemical Co., of Phillipsburg, N. J., has been elected to the board of directors of the Vick Chemical Co.

Fink Retires from Mishawaka

E. J. W. Fink has retired as president and general manager of the Mishawaka Rubber & Woolen Manufacturing Co., Mishawaka, Ind., after being associated with the company for 49 years. Succeeding him is George W. Blair, vice-president of the company since 1930. Mr. Fink joined the Mishawaka concern in 1897 as office boy and was appointed office manager eight years later. In 1915, he became assistant general manager and in 1921 was named general manager. He was appointed president of the company in 1930.

JAMES L. SPENCER, formerly vice-president of the Campbell-Ewald Co., Inc., advertising agency, has been appointed assistant to the president of the Industrial Tape Corp., New Brunswick, N. J.

H. J. LEISENHEIMER, formerly associated with the Cleveland Tractor Co. as executive vice-president, has been named director of export sales of the Hydraulic Press Manufacturing Co., Mt. Gilead, Ohio.

PAUL F. NIESSEN, director of research and development for the Victor Manufacturing & Gasket Co., Chicago 90, Ill., returned recently from Germany where he made an extensive investigation of the gasket industry.

W. MURRAY GALL, who has been associated with the American Hard Rubber Co., Butler, N. J., for the past six years, has joined the research staff in the rubber laboratory of E. I. du Pont de Nemours & Co., Wilmington, Del.

DR. WARREN L. MCCABE, head of the chemical engineering department of Carnegie Institute of Technology, Pittsburgh, Penna., will become director of research for the Flintkote Co. on February 1, 1947.

C. W. FLEETWOOD, formerly associated with the Gillette plant of U. S. Rubber Co. at Eau Claire, Wisc., is now professor of inorganic chemistry at North Dakota Agricultural College, Fargo, N. D.

G. L. SMITH, formerly traveling sales manager of the Republic Rubber Division of the Lee Rubber & Tire Corp., has been named head of the company's sales department, while MYRON C. MEYER, assistant sales manager, and RALPH W. DEEMER, sales correspondent, have been appointed traveling sales manager and assistant sales manager, respectively.

NORMAN C. HILL, formerly with the Pittsburgh Coke & Chemical Co., was recently named chief chemist of the Government Synthetic Rubber Laboratory operated at Akron by the University of Akron for the Office of Rubber Reserve.

5118 Fairprene Adhesive Cement

A new synthetic, waterproof adhesive, said to be more resistant to oxidation than similar natural rubber compounds, has been announced by the Fabrics Division, E. I. du Pont de Nemours & Co., Wilmington, Delaware. The new cement, designated as No. 5118 Fairprene Adhesive Cement, and developed at the Fairfield, Conn., plant, is recommended by the manufacturers for bonding nitrile rubbers and vinyl films or sheet stocks to rigid surfaces such as steel, aluminum, glass, wood or concrete. No. 5118 Fairprene Adhesive Cement is a thermoplastic synthetic elastic composition that does not require vulcanization to obtain maximum adhesive strength. Oils or straight gasoline will weaken the bond strength only slightly, although aromatic hydrocarbons will destroy the bond. Unaffected by temperatures as low as 40° F., the new cement's adhesive strength is weakened at temperatures of 160° F. and above. Full bond strength is regained, however, after cooling to normal temperatures. Cold-setting, the new adhesive will dry to a tacky surface, under average conditions, in three to 10 minutes, and dry completely within two hours.

Report on Rubber Insulation

Developments in the field of rubber insulation during 1945 are covered by J. T. Blake and R. Lyle, both of the Simplex Wire & Cable Co., Cambridge, Mass., in the latest issue of "Contributions of the Chemist to Insulation Research." This annual report, which is prepared by the Committee on Chemistry, Conference on Electrical Insulation, National Research Council, also covers electrical properties of matter, ceramic insulation, synthetic plastic insulation, insulating paper, and insulating oils. Copies of the latest report may be secured from John D. Piper, c/o Detroit Edison Co., 200 Second Ave., Detroit 26, Mich.

Reveals Plans for Utah Plant

Thermoid Co. has disclosed plans for the production of automotive and industrial products at its western plant being constructed at Nephi, Utah. Automotive products to be manufactured at the plant will include brake linings, clutch facings, universal joint discs, radiator and air hose, and V-type fan belts. The company expects to have three buildings at the new plant completed by December so machinery could be installed immediately thereafter.

List of Free Patents

A list of patents dedicated to the free use of the public has been compiled by the Patent Office. This list contains the numbers of 434 patents which may be used by any citizen of the United States without the payment of royalties or the necessity of securing a license. Copies of the list may be obtained from the U. S. Patent Office, Washington 25, D. C.

Offer Wood Flour Facilities

Allied Wood Flour & Fibres, Inc., was recently organized at 633 Middlesex St., Lowell, Mass., and is currently offering wood flour, cotton flock, rayon flock, and shredded leather to the rubber, plastic and other industries. The new company, headed by M. J. Watson as president, has acquired the wood flour and flock facilities of the Consolidated Fibre Corp., formerly located in Lowell. The latter company has retained its name and good will, and has entered the magnesium alloy foundry business at Waltham, Mass. Jesse Harrison and Franklin Thomas, both formerly associated with the U. S. Rubber plant in Lowell, are connected with the new Allied Wood Flour concern as plant manager and superintendent, respectively.

Enters Biochemical Field

B. F. Goodrich Chemical Co., Cleveland, Ohio, has announced its entry into the biochemical field. Extensive research and development have progressed to the stage where a number of new chemicals will soon be ready for commercial introduction. These new products will take the company further into the agricultural, textile, pharmaceutical, and household chemical field. Sever L. Hopperstead, formerly plant pathologist on the Delaware State Board of Agriculture, has been named service engineer to supervise development and field work for the new biochemical products.

Restores Kok-Saghyz Plantings

Kok-saghyz plantations in Russia, which were damaged during the war, are gradually being restored, according to reports in the Soviet press. Several collective farms are said to have gathered a good harvest of kok-saghyz roots and seeds in 1945. Yields on one farm were reported as high as 3,100 pounds an acre and in some of the special variety fields reached 5,800 pounds an acre. Kok-saghyz is being cultivated this year by 325 collective farms over an area four times larger than in 1945. Practically all kok-saghyz plantations are located on drained peat bogs.

Introduces New Tractor Tire

A new tractor tire that is said to deliver tremendous pulling power even under the worst soil conditions and to shed mud and litter as it rolls has been introduced by the Firestone Tire & Rubber Co., Akron. Called the Firestone Champion Ground Grip Tire, the new tire has curved, triple-braced high traction bars that give a "center bite." According to the company, performance tests on all types of soils show that the tire cleans up to 100% more effectively, delivers as much as 62% more pulling power, and gives up to 91% longer life than tires having straight, open center traction bars. The new tire is said to embody many innovations in design and construction. The wedge-shaped spaces between the curved tread bars continuously widen from the center of the tread to prevent clogging. The tread pattern is free of bar ends at the center around which litter can clog, the tread bars are higher, and an improved cross-section design makes the tread deeper at the shoulders of the tire.

Elastic Fabric Without Rubber

An elastic fabric without rubber has been developed by the U. S. Rubber Co. The elasticity of this new fabric, known as Strex, is achieved by twisting cotton yarn into the shape of a coil spring. According to the company, the fabric can be made in various degrees of elongation, with a maximum of 100%, and will withstand repeated laundering or dry cleaning. Uses so far developed include slipcovers, gloves, sweaters, and surgical bandages. It is not intended for use in girdles, corsets, and other foundation garments. The fabric is said to have a lower degree of tension than Lastex and similar materials deriving their elasticity from rubber.

Pneumatic Tire for Shuttle Cars

A new pneumatic tire for use on shuttle cars and other equipment used in underground mine service has been developed by the B. F. Goodrich Co., Akron. Designed for the severe demands of mine operation, the tire has round shoulders and extra thick sidewalls to protect it from snagging and cutting. The tire also has two-way traction, which is essential since shuttle cars operate in both directions. At present the tire is being produced in several sizes, including 7.50-15 ten-ply. Maximum load for this tire at five miles an hour is 4,340 pounds, at ten miles 3,880, and at thirty miles 2,530.

Wishes Argentine Agency

M. M. Padilla y Cia. S. R. L., Tucuman 695, Buenos Aires, Argentina, manufacturers' representatives and importers, is interested in hearing from American suppliers of rubber chemicals and compounding ingredients who wish representation in Argentina.

No. 4665 Industrial Adhesive

A new industrial liquid adhesive which requires no catalyst or special preparation for use has been introduced by the Finishes Division of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. Called No. 4665, the adhesive has been described as being tough and flexible, suitable for bonding metal foils and metal sheets to wood, plastics, and vulcanized natural and synthetic rubbers, as well as other substances having widely different coefficients of thermal expansion. An outstanding property of the new cement is said to be its six-month minimum package stability with no tendency to gel inside of a year. It can be applied without thinning by brushing, roller coating, knife coating, or dipping. The material contains 27.5% solids. Although insoluble in water, the bond strength of the material is lowered by continued immersion. However, original bond strength is regained after removal from water. The dried adhesive film is reported resistant to dilute alkalis, acids, corrosive salt solutions, and mildew and fungi.

New Oil and Gasoline Hose

Lighter weight, increased flexibility, and greater softness are said to be achieved in a new oil and gasoline hose developed by the U. S. Rubber Co. for use in unloading oil trucks and tank cars. The carcass of the hose consists of two plies of Ustex, the company's chemically-treated textile. Three plies of cotton were formerly required. The hose is lined with a synthetic rubber compound which resists aromatics and high octane fuels. Because of reduced outside diameter, standard size couplings may be used on the new hose, whereas oversize couplings were required on the three-ply construction.

U. S. Royal Adhesive M6165

A new adhesive for sealing corrugated paper cartons has been developed by the U. S. Rubber Co. to speed up packing operations. The new cement, known as U. S. Royal Adhesive M6165, is said to produce a permanent bond resistant to extremely high and low temperatures. The material has a synthetic rubber base and may be applied with a spray gun, thus saving time formerly required in applying adhesive materials by brush or in sealing cartons with metal staples.

Desires Agency in Portugal

Salmon & Cia., Ltd., Rua do Arsenal 54-3, Lisbon, Portugal, representatives of the Monsanto Chemical Co. in Portugal, is interested in hearing from other American manufacturers of various compounding ingredients used in the rubber field, including magnesium carbonate, titanium dioxide, and lithopone, who are seeking sales representation in that country.

Mannequin Sewing Sets

Fashiondol mannequin sewing sets, consisting of unbreakable rubber mannequins in thirteen-inch and sixteen-inch sizes, together with dress materials, sewing accessories, dress forms and sewing books, are again being manufactured by Latexture Products, Inc., and distributed by Fashiondol, 17 Rose St., New York 7, N. Y. According to the manufacturers, many schools throughout the country are using the sets in the classroom, thus combining fun and education and giving the young girl her first experience in making and designing clothes.

Viscosity Controlling Agent

Modicol L, a new non-ionic surface-active agent, has been developed by the National Oil Products Company, Harrison, New Jersey, as an agent for controlling viscosity, particularly in latex compounds. When used in concentrations of 0.1% to 1.0%, it is said to have the power of maintaining constant surface tension in the compounding of all types of synthetic latices and water dispersions of rubber. Modicol L is recommended by the company as a valuable additive in any compound where surface tension is an important factor, such as latex adhesives, pigment pastes, dipped goods compounds, and coagulants.

Conneaut Firm to Move

Manufacturing activities of the Rubber and Chemical Products Co. will be moved from Conneaut, Ohio, to Jefferson, Ohio, as soon as work has been completed on two of three concrete block buildings at the latter location. The company, which has been producing hard rubber dust and similar materials for the past several years, is also planning the manufacture of finished rubber and plastics items at the new plant.

Modernizing Phoenix Plant

The manufacturing facilities of the rubber division of the Phoenix Manufacturing Co. at Joliet, Ill., are being completely revamped, and considerable new equipment, including presses and mixers, is being installed. When finally installed, the new equipment will represent a completely new sequence of operation at the plant. Harry L. Arbogast, once associated with the Dunne Rubber Co., is manager of the company's rubber division.

Complete Large Conveyor Belt

One of the largest single conveyor belts ever made has just been completed by the B. F. Goodrich Company for one of the most important users of this product in this country. Of the cord conveyor belt design which the company features, the roll of belting contains 5100 feet of 48 inch, five-ply belt, weighs about 72,000 pounds. The diameter of the roll is 25 feet. The belt contains approximately 1750 pounds of cotton in its construction. In order to shut down the conveyor system on which the belt will operate for the shortest possible time, six lengths in which the belt had been constructed were spliced together at the customer's plant. A special frame and windup were built at the point of installation so that when the time comes for changing belts, the new one will be fastened to the end of the old, pulled over the pulleys and spliced endless on the job. A shelter will be built over the belt to protect it from the weather.

To Enlarge Painesville Plant

Glenn L. Martin Co. has announced that it plans to more than double the productive capacity of its chemical plant now under construction near Painesville, Ohio. Plans for the Painesville plant, which will produce Marvinol, a rubber-like plastic, call for an increase from 11,000,000 to 25,000,000 pounds in annual capacity and one of cost of construction from $1,500,000 to $3,000,000. The plant is expected to be in production in April, 1947, but it will be late next year before the extended capacity is expected to affect the plant's output and deliveries. The company expects to reach full production early in 1948.

Donates $250,000 to Liberia

At a banquet at the Waldorf Astoria Hotel in New York City on September 20, commemorating the one hundredth anniversary of the independence of the Republic of Liberia, Harvey S. Firestone, Jr., president of the Firestone Tire & Rubber Co., Akron, presented the Consul General of Liberia with a gift of $250,000 for a new Institute for Research in Tropical Medicine to be established in Liberia. Mr. Firestone described the donation both as a memorial to his father, founder of the Firestone organization, and as a contribution to the West African republic's centennial program.

Accident Prevention Manual

"Accident Prevention Manual for Industrial Operations" is the title of a new publication issued by the National Safety Council, Inc., 20 North Wacker Drive, Chicago, Ill., as a ready reference for the safety director, safety engineer, and foreman. The manual discusses the principles of safety for operations common throughout industry.

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"B" NATURAL

STATEX-B

a Natural for

- FAST CURE
- GOOD WEAR
- GOOD AGING
- GOOD REBOUND

COLUMBIAN CARBON COMPANY

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COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
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FURNEX

A COLUMBIAN COLLOID

for **HIGH RESILIENCE** *in*

GR-S

•

STATEX-93 The carbon for heavy-duty reinforcement

MICRONEX For 30 years the standard reinforcing carbon

COLUMBIAN CARBON COMPANY

400 TONS OF SMOKE A DAY

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Elastomer No. 105

Elastomer No. 105, a rubber-like viscous material which is said to be able to take finest details from the mold, has been developed by Electro-Technical Products, Inc., Nutley 10, N. J. Possessing 100% solid content, the new rubber-like plastic is said to cure and polymerize by heat application. After curing, it becomes a solid elastomeric mass similar to pure gum rubber. The material is said to have unusual high resistance to most solvents, including aromatic hydrocarbons, oils, acids, alkalis, and water. It has a specific gravity, depending on formulation, of 1.4 to 1.7, tensile strength of 200 to 1100 pounds per square inch, and elongation of 200 to 350%. A curing temperature of 160° C. is recommended by the company. Special compounds may be custom formulated to be cured at as low a temperature as 95° C. The curing time depends upon the thickness of the finished product—approximately five minutes per ⅛-inch is required at 160° C.

Orvus WA Paste Mold Lubricant

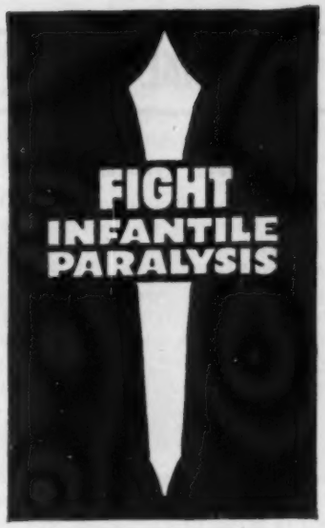
Procter & Gamble Distributing Co., Cincinnati 1, Ohio, has developed a new mold lubricant for rubber. Called Orvus WA Paste, the lubricant's active ingredient is the sodium salt of sulfated lauryl alcohol. It is said to dissolve readily and to be quick and easy to apply. According to the company, the usual concentrations used range between two and three ounces per gallon although concentrations as low as one-half ounce or as high as six ounces per gallon may be used. Variations in the stock used and the design of the mold govern the strength of solution used. The solutions may be applied either to the mold or the rubber to be molded, by either wiping, brushing, or spraying, depending upon the product and the preference of the plant. The material is also being used in the rubber industry as an aerating agent in making foam rubber products and to clean other solidified lubricants from rubber surfaces.

Library Research Service

A library research service of special interest to industrial and scientific organizations not having ready access to the wealth of scientific literature in New York City is being offered by the Technical Library Consultants, 347 Madison Ave., New York 17, N. Y. The service is specifically designed to meet the literature research needs of executives, sales, and research departments.

Silver Anniversary Medal

A commemorative medal, which honors F. A. and the late C. W. Seiberling, upon the twenty-fifth anniversary of the company which they founded on November 16, 1921, has been created by the Seiberling Rubber Co., Akron.



MARCH OF DIMES
JANUARY 15-30

To Produce Ethylene Products

Ethylene glycol and ethylene oxide are among the initial products which will be manufactured at a plant being constructed at Port Neches, Tex., by the Jefferson Chemical Co., Inc., which was organized in 1944 by the Texas Co. and the American Cyanamid Co. to produce chemicals from petroleum and petroleum gases. Ethylene glycol is used in the manufacture of cellophane, synthetic resins and other products, while ethylene oxide is an intermediate chemical which is employed in the manufacture of acrylonitrile. Production at the plant is expected to begin during the summer of 1947.

Patents Placed on Register

Petrolite Corp., Webster Groves, Mo., has placed 408 of its patents on the Patent Register, thus making them available for license or sale. Over 300 of these patents relate to the chemical treatment of petroleum oils, while the others cover electrical dehydration or desalting of petroleum oils. Lists of these patents may be obtained from the Register of Patents, U. S. Patent Office, Washington 25, D. C.

Acquires Hydraulic Press Firm

Lake Erie Engineering Corp., Buffalo, N. Y., designers and manufacturers of all types of hydraulic presses and special machinery, has acquired the Feller Engineering Co., Pittsburgh, Penna., specialists in hydraulic extrusion presses and allied lines. Lake Erie is one of the leading designers and manufacturers of heavy hydraulic press equipment for plastics molding and a wide variety of process industries.

Report on Glues in Germany

New self hardening glues for making strong wood-to-wood joints at room temperature, hot press melamine glues, and other synthetic adhesives developed in Germany are described in a report which has been made available by the Department of Commerce. According to the report, several types of "Polystal," a self hardening glue made from "Desmodurs" and "Desmophens," have been made on a large scale in an I. G. Farbenindustrie pilot plant. The Desmodurs are polyfunctional isocyanates, while the Desmophens are polyesters prepared by esterification of adipic and phthalic acid with trihydroxy alcohols, such as glycerine, or with dihydroxy alcohols. One type of Polystal is said to have been used successfully in Germany for obtaining adhesion between Buna rubber and rayon tire cords. Copies of the report may be obtained from the Office of Technical Services, Department of Commerce, Washington 25, D. C., for $5 in photostat form and $2 in microfilm form.

Heyden Buys Phenol Plant

A phenol plant in Memphis, Tenn., has been acquired by the Heyden Chemical Corp. from the War Assets Administration for $1,060,000. Located on a 68-acre site within the city, the Memphis plant, known as the Southern Acid and Sulphur plant, was built during wartime but never placed in operation. The company expects to begin production of synthetic phenol before November 15. The process to be used involves the production of caustic soda and chlorine, chlorbenzene and, finally, phenol, which will be shipped elsewhere for conversion into salicylic acid. The raw materials used will include benzene and salt from nearby Louisiana mines.

Service for New Inventions

National Merchandisers, 28 E. Huron St., Chicago 11, Ill., a merchandising, research and marketing organization, has established a marketing service for new inventions. According to the company, the purpose of the new division will be to help the small or average inventor at every step, from the beginning or birth of his idea until the invention has been properly developed for manufacturing operations, or is on the market as a finished device or article.

Water Resistant Tennis Ball

An Australian rubber company has produced a tennis ball that is 2½ times more resistant to water than the ordinary ball, according to a report received by the Department of Commerce. After contact with water, it is reported that the new ball can be used immediately without damage to racket strings. The on the playing or wearing qualities of water-proofing is said to have no effect the ball.

Announce Improved Perbunan

Stanco Distributors, Inc., New York, has announced that Perbunan now contains a new stabilizer which helps to reduce staining and discoloring to a great extent. All Perbunan manufactured after December 1, 1946, will have this improved property. Laboratory and factory tests are reported to indicate that Perbunan 26 NS may be substituted directly for the present grade of Perbunan 26 without change in processing characteristics. Perbunan 35 NS is a somewhat softer and more processable polymer than Perbunan 35 HPLE and can be substituted for most applications. Perbunan 18 originally contained the best non-staining stabilizer which could be used for this polymer and therefore no change has been made in this material. The change of stabilizer is said to make it possible to use Perbunan in light colored articles and where delicate colors are desirable. It also makes possible the use of Perbunan as a plasticizer and processing aid in p.v.c. compounds either in plain or colored products. Tests have also indicated that the improved Perbunan should be satisfactory for gasoline dispensing and distillate hose.

Seiberling Promotes Leedy

Arthur A. Leedy, formerly manager of the company's engineering department, has been appointed director of engineering by the Seiberling Rubber Co., Akron. Mr. Leedy's position is a new one in the Seiberling organization. It places him in charge of engineering policy at the company's Barberton, Ohio, plant and other existing or prospective plants of the company. The company also has announced that J. E. Kallgren, formerly a project engineer of the U. S. Rubber Co. and previously a staff engineer for the Firestone Tire & Rubber Co. from 1933 to 1942, has been named chief engineer of its Barberton plant.

New Laminated Plastic Resin

A new resin, which makes possible the production of laminated plastics that are said to be lighter than aluminum sheet but to possess greater tensile strength, has been developed by the Goodyear Tire & Rubber Co., Akron. Known as GRM-2, the new resin is a derivative of a complex organic glycol. One of the chief advantages claimed for GRM-2 is that it can be molded at low pressures ranging from 15 to 40 pounds per square inch.

Enters Tube Manufacturing Field

Cascade Rubber, Inc., 2828 Second St., Cuyahoga Falls, Ohio, producer of camelback and tire repair materials, has started the manufacture of inner tubes for passenger cars and trucks. Located in a plant with 15,000 square feet of floor space, the firm is equipped to produce 1,000 tubes a day. William G. Lerch is president of the company.

FINANCIAL NEWS

American Cyanamid Co.

Nine Months: Net income of $6,191,005, after deducting all charges including a $4,400,000 provision for taxes, which is equal to $2.07 each on 2,737,526 shares of common stock, and which compares with $4,545,273, or $1.47 each on 2,707,026 shares of common stock, for the corresponding period of the previous year when $8,800,000 was deducted for taxes.

Johnson & Johnson

Nine Months: Net income of $5,262,000, after deducting taxes and all charges which is equal to $5.58 each on 896,025 shares of common stock, and which compares with $2,410,000, or $2.44 each on 891,911 shares, for the similar period of the previous year.

Monsanto Chemical Co.

Nine Months: Net income of $6,987,663, after deducting all charges and taxes, which is equal to $1.63 each on 3,803,835 common shares, and which compares with $4,101,205, or $2.71 each on 1,267,868 common shares, for the corresponding period of the previous year.

Minnesota Mining & Mfg. Co.

Nine Months: Net income of $6,595,330, which is equal to $3.38 each on 1,951,530 capital shares, and which compares with $3,180,656, or $1.63 a share, for the corresponding period of the previous year.

United Carbon Company

Nine Months: Net income of $2,107,507, which is equal to $5.30 a share, and which compares with $1,377,245, or $3.46 a share, for the corresponding period of the previous year.

New Jersey Zinc Co.

Nine Months: Net income of $3,434,010, which is equal to $1.75 a share, and which compares with $3,758,212, or $1.92 a share, for the corresponding period of the previous year.

Raybestos-Manhattan, Inc.

Nine Months: Net income of $1,014,310, which is equal to $1.61 a share, and which compares with $1,022,344, or $1.63 a share, for the corresponding period of the previous year.

Pantasote Company

Nine Months: Net income of $375,800, which is equal to 98c each on 385,138 shares. Comparative figures for the similar period of 1945 are not available.

Polyisocyanates Introduced

The Organic Chemicals Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware, has announced the availability of the polyisocyanates, new type basic chemicals which react, in general, with any molecule, natural or synthetic, that contains hydrogen replaceable by sodium, to form polymeric compounds. These new materials are miscible in all proportions at room temperatures with a wide range of inert organic solvents, e.g., acetone, ethyl acetate, carbon tetrachloride, kerosene, toluene, and nitrobenzene. They polymerize spontaneously, but slowly at room temperatures; above 200° C., however, the rates are greatly accelerated. The polyisocyanates have been used in Germany for the production of numerous items, including adhesives for wood to wood, rubber to steel, rubber to fiber; coatings for rubber, paper, wood, etc.; and waterproofing for fibers such as wool, cotton and paper. Two types are currently available, namely, hexamethylene di-isocyanate and toluene 2, 4-di-isocyanate.

Reveals Windsor Plant Output

At the tenth anniversary celebration of the Windsor Manufacturing Co., subsidiary of the Goodyear Tire & Rubber Co., in Windsor, Vt., on November 21, F. R. Evans, production manager of the parent company's shoe products division, revealed that the Windsor plant had manufactured more than 450,000,000 pairs of rubber and Neolite heels in the past decade. During the ten years of its existence, the Windsor plant also was reported to have manufactured the following: 75,000,000 pairs of rubber and Neolite soles; more than 1,200,000 gallons of cement for shoemaking purposes; all of the soles and heels for the U. S. Army ski boots; and all of the rubber heels for paratroop boots used by the Army during World War II.

Absorbs North American Corp.

The Isbrandtsen Co., Inc., 26 Broadway, New York 4, N. Y., importers of rubber and other commodities, has absorbed the North American Trading Corp., one of its wholly-owned subsidiaries. The business heretofore conducted as North American Trading Corp. will continue to function as the East India Division of Isbrandtsen Co., Inc. Arthur Weber is in charge of the rubber activities of the Isbrandtsen firm.

To Produce Glo Seed Oil

Hutchman Co., Inc., was recently organized in Lakeland, Fla., to engage in the manufacture of Glo Seed Oil, a citrus seed oil which is said to be suitable for use in the manufacture of rubber and plastics articles. The citrus seed oil will be produced in a plant which is nearing completion in Lakeland. Dr. J. E. Hutchman is president of the company, and A. R. Garver is vice-president.

Materials Handling Exposition

The rubber industry's problems of materials handling will receive special attention in a separate program of prepared papers and panel discussions at the first national Materials Handling Exposition, to be held at the Public Auditorium, Cleveland, Ohio, from January 14 to 17. Outstanding experts from the rubber industry will lead the discussions. Rubber industry executives will have the first opportunity to see and compare under one roof competing systems and machinery for materials handling. All phases of materials handling will be considered during the four-day meeting, with the rubber industry problems in the forefront. Production and assembly line materials handling, as well as handling for receiving, shipping, loading and warehousing departments, will be considered by the panels, and appropriate machinery will be exhibited on the Exposition floor. On exhibition will be hoists, hoist mountings, cranes, derricks, conveyors, hand and power trucks, skids and pallets, tractors and trailers. Tickets to the sessions may be obtained from the Exposition Management, Clapp & Poliak, Inc., 37 Wall St., New York 5, N. Y.

CMC Cellulose Derivative

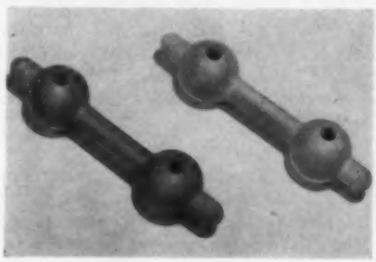
The commercial production of CMC, a new cellulose derivative, has been announced by the Hercules Powder Co., Wilmington, Delaware. The new material is the sodium salt of carboxymethylcellulose formed by the reaction of monochloroacetic acid with alkali cellulose, and is currently available in three viscosity types. Included among its properties are these: water-soluble, yet can be made relatively water insoluble; adhesive, but not sticky; insoluble in organic solvents; forms tough films; not only acts as an emulsifying agent in oil-in-water emulsions, but also protects the emulsion. CMC can be used for the thickening of rubber latex, in can-sealing compounds, and in sizes and finishes for textiles. While it is not solely an adhesive, it can give adhesive or binding properties for special purposes.

Presidential Research Board

President Truman established a new government coordinating agency, the Presidential Research Board, on October 17, and charged it with responsibility for assuring that Federal activities in the field of science were used most effectively in the national interest. The new board was created by Executive Order 9791, which put John R. Steelman, Director of the Office of War Mobilization and Reconversion, at the head of a twelve-member board comprising Cabinet members and other high Federal officials. It was generally believed that the board might be an executive substitute for the proposed National Science Foundation which Congress failed to create during the closing days of the last session.

Binney-Bell Teething Toy

A new teething toy, made of rubber in pink or blue, has been introduced by the Binney-Bell Toy Co., 208 West Eighth St., Los Angeles, Calif. Called the Binney-Bell, the teething toy measures six inches in length, with a chewing



nipple at each end which is flexible and chewable and has a slightly ridged surface. Behind each teething end is a ball-shaped object, inside of which is sealed a rust proof silver bell. The jingling bell affords added play value for the baby, yet it is said to be absolutely safe due to its built-in feature. Because of the design of the center bar, the baby can grip and hold the toy easily. There are no sharp edges to scratch or harm the child. The toy is said to be pediatrician-approved for practical and safe teething use and for normal mouth development. It may be washed and sterilized to safeguard the health of the baby.

Indonex R-40 Plasticizer

Standard Oil Co. (Indiana), 910 South Michigan Ave., Chicago 80, Ill., has introduced Indonex R-40 Light Process Oil as a supplement to its line of Indonex rubber plasticizers. The new plasticizer is said to permit production of light-colored stocks which will not discolor in sunlight and which will not stain automotive and refrigerator finishes. It is also said to be advantageous where easy handling and cool milling are controlling factors. Blended from coastal oils to give low aniline point and optimum viscosity, its compatability with neoprene and other synthetic rubbers is described as outstanding. Its typical properties are given as follows: flash of 330° F., viscosity at 100° F. of 145, viscosity at 210° F. of 41, and an aniline point of 74.5° C.

Flooring Installed in Ship

Approximately 70,000 square yards of rubber flooring was installed in the SS America by the Goodyear Tire & Rubber Co., working with Selby-Battersby & Co., flooring distributors, before the ship was returned from military duty to the United States lines by the U. S. Maritime Commission. Rubber flooring was provided for lounges, corridors, staircases, playrooms, and decks. The 35,000-ton liner transported about 500,000 soldiers during the war.

New Chemical Bonding Agent

MDI-50, methylene-bis (4 phenyl isocyanate), a new chemical bonding agent, has been developed and introduced by E. I. du Pont de Nemours & Co., Wilmington, Delaware. The new material reacts very rapidly with all compounds having a replaceable hydrogen atom; for example, all types of cellulosic materials, many types of resins, most all types of elastomers, and such chemicals as alcohols, phenols, amines, esters, acids and water. It also polymerizes particularly at elevated temperatures. The reactivity of MDI-50 coupled with the fact that the chemical has two reactive groups in a single molecule suggests its use as a cross-linking agent. It would also appear to be useful in the preparation of composite articles in which it is desired to increase the adhesion between the component parts. One of the most important of such uses is the manufacture of composite articles from textile fabrics such as rayon and nylon and elastomeric materials such as neoprene and GR-S. MDI-50 is being marketed as a solution in ortho-dichlorobenzene containing 50% active ingredient.

Soviet Plant Under Quota

According to a recent report in the *New York Times*, a correspondent of the Russian newspaper *Izvestia* sharply criticized the Soviet Ministry of the Rubber Industry, saying that it had paid virtually no attention to its largest enterprise, the Red Triangle factory in Leningrad. The factory fell short by 1,500,000 pairs of rubber footwear of of this year, the correspondent wrote, and this debt to the State was said to the planned production for the first half be increasing during the second half of the year. Idle time at the plant during July was reported to amount to more than 20,000 man-hours because materials did not reach conveyor belts. Average production on the galoshes conveyor is sixty pairs per worker a day, according to the correspondent, while the plant's average is approximately ten pairs per day for each worker.

Incorporate Syracuse Rubber

Syracuse Rubber Products, Syracuse, Indiana, has been incorporated after operating as a partnership for the past two years. Employing 75 persons, the concern produces rubber seals, gaskets, and packings, as well as custom designed molded mechanical specialties. Officers of the company are Elmo E. Niccum, president; William J. Johnson, vice-president in charge of laboratory; Charles E. Snyder, vice-president in charge of engineering; and Paul L. Lantz, secretary and treasurer. Mr. Niccum was formerly vice-president of the Goshen Rubber & Manufacturing Co., Goshen, Ind. Hubert Anglemyer is general manager in charge of operations for the company.

CANADIAN NEWS

At a meeting of the Purchasing Agents Association of Essex and Kent, held recently in Sarnia, Ontario, A. P. Machin, manager of the Polymer Corp., described the development of a foam sponge rubber latex, cheap enough to bring foam rubber mattresses within the reach of all consumers, as one of the brightest possibilities in the field of synthetic rubber research. The speaker anticipated that such a latex might have the effect of adding 50% to the rubber consumption of rubber manufacturers, enabling them to build up a market which might have importance second only to that of tires. Mr. Machin revealed that one of the world's largest rubber companies has announced plans for the construction of a plant at New Toronto, Ontario, for the manufacture of foam sponge rubber, and he predicted that it may not be long before all the larger companies entered the field.

B. F. Goodrich Co. of Canada is soon expected to open a plant at Stratford, Ontario, which was formerly owned by a textile firm, but which had not been used for manufacturing. Containing 5,000 square feet of floor space, the plant will be used by Goodrich for warehousing with provision for some light manufacturing.

The following amounts of rubber footwear and footwear materials were exported from Canada during the month of September, 1946: 168,682 pairs of rubber-soled canvas shoes, valued at $151,527, as compared with 94,676 pairs, valued at $87,477, exported during September of the previous year; 109,899 pairs of rubber boots and shoes, valued at $156,405, against 178,831 pairs valued at $325,497, exported during September, 1945; 63,054 pairs of rubber heels, valued at $5,463, as contrasted to 185,428 pairs, valued at $27,854, exported during the similar month of the previous year; and 9,835 pairs of rubber soles, valued at $1,678, as compared with 12,338 pairs, valued at $3,170, exported during September, 1945. Exports of rubber soling slabs in September, 1946, totaled 13,390 pounds, valued at $3,201, as compared with 23,658 pounds, valued at $4,414, exported during the corresponding month of the previous year.

Frank G. Rice, of the plastics division of Canadian Industries, Ltd., stated at a recent meeting of the Young Men's Canadian Club in Montreal that the plastics industry in Canada is a $10,000,000 business and that it shows every indication of further growth. Mr. Rice pointed out that in Canada thirteen plants are either in operation or in the course of construction to manufacture plastics materials, and he felt that the industry would be a contribution to national economy and indirectly would aid the growth and development of other Canadian resources.

Canadian manufacturers of rubber and canvas footwear have been granted a price increase of 10 to 25 cents a pair by the Wartime Prices and Trade Board. The increase was authorized to partially offset additional costs to the manufacturer resulting from increased material costs and increased labor rates.

Marcus L. Brown, president of the Seiberling Rubber Co. of Canada, Ltd., Toronto, Ontario, was honored as the thirteenth oldest employee of the parent company at its twenty-fifth anniversary celebration, held in Akron, Ohio, on November 16.

W. J. Scott, who has been associated with Gutta Percha & Rubber, Ltd., Toronto 3, Ontario, since 1887, most recently as manager of its mechanical goods department, has retired from active duty with the company. However, Mr. Scott will continue his connection with the company in an advisory capacity until next August. E. H. Coon, formerly supervisor of the company's merchandising department, has succeeded Mr. Scott as manager of the mechanical goods department, with A. P. Dawson being assigned as assistant manager.

Ernest W. Barbour has been appointed trade sales manager of the Firestone Tire & Rubber Co. of Canada, while Stephen F. Palmer has been named manager of manufacturers sales and John W. Fortner has been appointed manager of the company's dealers' stores merchandising division.

Voit Rubber & Textile Co., subsidiary of the W. J. Voit Rubber Corporation, 1600 East 25th Street, recently purchased the Gastonia, N. C., plant of the Carolina Arts Co., and is continuing the production of cotton sheetings for use in the manufacture of athletic equipment at its Los Angeles plant.

Lays Laboratory Cornerstone

Dr. Howard E. Fritz, vice-president in charge of research for the B. F. Goodrich Co., laid the cornerstone for the company's new research center located in Brecksville, Ohio, midway between Akron and Cleveland, on November 27. The laboratories will cost the company more than $1,000,000.

Hydrotherm Heating Method

Fuel savings up to 35 percent have been effected in the textile industry and even higher savings in rubber, chemical and food processing plants through the installation of "hydrotherm heating," according to Paul L. Geiringer, chief engineer of the American Hydrotherm Corp., 215 East 27th St., New York 16, N. Y. "Hydrotherm heating" is a term used to cover the harnessing of heat of high temperatures, the heat being carried by a liquid rather than high pressure steam. Capable of being installed with any boiler or power plant design, the system is convertible at any time from direct boiler-supplied heating to combined heating and power generation. Savings in service and maintenance are claimed for the system through the elimination of condensate traps (repairs), condensate tanks (scale deposits), condensate pipelines (corrosion), pressure reducing valves, and boiler feeding equipment. "Hydrotherm heating" is said to require only minimum maintenance of circulating pumps in the boiler house. Use of the system is reported to eliminate heat losses in process equipment occasioned by loss of steam escaping through liquids, irregularity of liquid level, insufficiency of temperatures for drying, and uneven heat distribution and insufficient temperatures for presses, calenders, etc.

Pawtucket Plant Sold

The Pawtucket, R. I., plant of the General Cable Corp. has been sold for $600,000 to the International Wire & Cable Corp., a newly organized concern which is reported to be connected with the Leviton Manufacturing Co., Brooklyn, N. Y. Involved in the transaction were 35 lots of land. Under General Cable, the plant employed 450 persons in the production of insulated wire and cable, but plans for the operation of the plant by the new company have not been made known. The paper of incorporation of International Wire, which lists Max Winograd, Marshall B. Marcus, and Irving Winograd as incorporators, indicates that the company was organized to manufacture and sell electrical supplies. The capital stock authorized was for $25,000 in common and $1,000,000 in preferred shares.

Hubler Retires from Faultless

Clement D. Hubler, who has been associated with the Faultless Rubber Co. for thirty-nine years, has retired from active duty as executive vice-president of the company. Mr. Hubler joined Faultless in 1907 as timekeeper, and was advanced steadily up to the post of president, in which capacity he served from 1938 to 1941. When Wallace De Laney was appointed president of the company in 1941, Mr. Hubler became executive vice-president. He will continue to serve as a director and as a member of the company's executive committee.

LOS ANGELES NEWS

Despite the record rainfall (described locally as a "heavy mist") which fell in Los Angeles on the night of November 12th, the meeting of the Los Angeles Rubber Group at the Mayfair Hotel was met with the usual large turnout.

The regular meeting was preceded by the meeting of the Technical Group, in charge of Elliott "Mac" McLaughlin (Royal). The guest speaker was Dr. Raymond B. Stringfield, who recently became co-owner of the Fullerton Mfg. Co., Fullerton, Calif. Dr. Stringfield's talk was on "Costing Rubber Compounds," in which he emphasized the proper costing of rubber materials as the factor in profit and loss.

C. M. Reinke (Reinke & Amende), Chairman of the Group, opened the business meeting after a delicious dinner and introduced the new members of the Group who stood up singly and received the applause of their fellow members.

Then Mr. Reinke made the announcement that Mr. T. Kirk Hill (Kirkhill) was honeymooning in Hawaii. The members sighed and conjured beautiful tropical scenes of Mr. Hill and his bride amid swaying grass skirts and leis, with Diamond Head in the background.

Phil Drew (Goodyear) was introduced and reported on the progress of the planning for the coming Christmas party. On Tuesday night, December 3rd, members of the Group attended a showing of Ken Murray's "Blackouts of 1946."

Robert L. Short (Kirkhill) reported to the members on the progress of the Yearbook, which will be distributed to members very soon. Mr. Short also told the members of the new list of suppliers to the industry which the Group is compiling. Mention was made of the value of the RUBBER RED BOOK as an aid in compiling the new list.

The next member to be introduced was Dr. Raymond B. Stringfield (Fullerton), founder and first chairman of the Group. Dr. Stringfield remarked on the growing membership of the Group and introduced the main speaker of the evening, Mr. Paul S. Shoaff (Goodyear).

Mr. Shoaff delivered a very timely talk on "The East Indies Situation." His remarks qualified him as an expert due to his many years spent as resident director of the Goodyear Rubber Plantations in the Far East.

Java and Sumatra, Mr. Shoaff related, are in chaos. The Dutch had no troops to take over the islands when the Japs surrendered. The British, acting for the Allies, have tenuous control only of the main ports and the largest cities. All other areas are held by the Indonesian Nationalists. The extremists, composed of thousands of young natives indoctrinated and trained by the Japs, oppose Dutch return on any basis, while the Moderates and Dutch discuss the future political status of the Netherland East Indies—so far getting nowhere. Final outcome will mean political and economical conditions quite different, at least in Sumatra and Java, from those of prewar colonial days.

"It will be months," Mr. Shoaff said, "before Java starts shipping rubber, and that is dependent on peace between Indonesian Extremists and Dutch." The only rubber coming out of Sumatra and Java is smuggled out via Chinese middle-men. And it will not be until next year when first quality rubber is exported from the Netherland East Indies.

The stripping of the islands' facilities in transportation and utilities, along with the neglect of rubber plantations during the Japanese occupation, are all factors in the present lack of rubber from those areas.

Mr. Shoaff pointed out that as a result of the awakening of the natives in the islands, labor costs in producing natural rubber will remain at an increased level. Whereas the large rubber companies produced rubber in those areas at a cost of 12c per lb., the probable cost in the postwar period will remain at 15c per lb.

The potential annual output under normal conditions were outlined as follows: Sumatra, about 450,000 long tons; Java, 130,000 long tons; British Malaya could produce about 650,000 long tons, but will probably be shipping at only 60% of that rate by the end of 1946.

"So the U. S. must roll out about 650,000 long tons of synthetic rubber this year," Mr. Shoaff said, "and considerable tonnage of synthetic is indicated for an indefinite period."

After Mr. Shoaff's informative and interesting talk, the members were shown action pictures of the rubber plantations and natives in the East Indies Islands.

The following members were nominated as candidates for offices in the Los Angeles Rubber Group for 1947 at the meeting of the group held on November 12: Curtis R. Wolter (U. S. Rubber), chairman; Phil Drew (Goodyear), associate chairman; Charles Churchill (Dougherty), vice-chairman; Maurice H. Chishold (Kirkhill), secretary; Jack C. Ballagh (Patterson-Ballagh), treasurer. Nominations are tantamount to election in the group.

Three directors will be selected from among the following nominees: Robert D. Abbott (C. P. Hall), Leonard C. Boller (U. S. Research), B. E. Dougherty, E. H. Lewis (Western Insulated Wire), Elliott McLaughlin (Royal), Bob Short (Kirkhill), Bill Thomas (Firestone), and John Hoerger (Schrader).

Fred Carpenter has returned to New York after surveying the U. S. Rubber Company's plantations in the Malay States.

Frank Shew has written his friends in the rubber industry that his experiences in Bogota, Colombia, South America, have been interesting, but strenuous.

George W. Miller (U. S. Dept. of Agriculture) is now doing consulting work at the W. J. Voit Rubber Corp.

Frank Merrill has been instrumental in the formation of the new Western Rubber Co.

Howard L. Wiley, formerly associated with the W. J. Voit Rubber Corp., is now associated with the Technical Division of the U. S. Rubber Co.

Merger Plan Terminated

The consolidation agreement between Pantasote Co. and the Textileather Corp. has been terminated, and the stock registration statement of Pantasote Plastics, Inc., the planned new parent company, has been withdrawn from registration with the Securities and Exchange Commission. A spokesman for Pantasote indicated that the consolidation had been scrapped because of unsettled economic conditions. He emphasized, however, that neither of the companies would suffer financially from the abandonment of the merger, the only result being that a proposed expansion would no longer be possible. The status quo of the two organizations is expected to be maintained indefinitely.

Develops Good-Rite Fungicide

A new agriculture chemical, which is said to be an effective fungicide when used alone and to be equally effective when mixed with insecticides and other fungicides, has been introduced by the B. F. Goodrich Chemical Co., Cleveland, Ohio. The introduction of the new chemical, one of a group known by the trade name "Good-Rite," follows the recent entry of the company into the biochemical field. The chemical is supplied as a latex closely resembling dispersions of many synthetic rubbers both in appearance and physical characteristics. Basic material for the fungicide is polyethylene polysulfide, derived from petroleum and sulfur.

Association Reelects Officers

At a recent meeting of the Rubber Trade Association of New York, Inc., 15 William St., New York 5, N. Y., the following officers were reelected for one-year terms: R. D. Young, president; Jacobus F. Frank, treasurer; and B. G. Davy, secretary. Bancroft W. Henderson, manager of the rubber and rubber chemical department of the industrial chemicals division of the American Cyanamid Co., was elected chairman of the board.

Reveals Channel Black Shortage

A severe shortage of channel carbon black, which will continue throughout the next few months, was revealed in Boston on December 11 by Owen J. Brown, Jr., general sales manager of Godfrey L. Cabot, Inc. The stock position of the channel blacks, Mr. Brown said, was steadily decreasing and there is little chance of increasing such stocks during the first six months of 1947. As a matter of fact, he added, manufacturers using channel blacks have been living off stocks on hand during 1946, but "we are now at the bottom of the bin and there probably is less than one week's supply in the warehouses of the entire carbon black industry." Pointing out that consumption of channel black during the current year has exceeded the supply by about 10%, Mr. Brown stated that the only channel black available for shipment is the current production. He added that all of the resources of all the carbon black manufacturers combined are insufficient to meet the demand. One of the principal reasons for the channel black shortage was given as the unexpected return of natural rubber, the compounding of which calls for a larger percentage of channel type carbon black than does synthetic rubber, the latter using greater proportions of the furnace blacks.

Pageant Marks Anniversary

An elaborate musical pageant, presented under the name of "Something Accomplished," which depicted the company's quarter-century history, was the highlight of activities in Akron last month marking the Silver Anniversary of the Seiberling Rubber Co. The celebration included a banquet at the Hotel Mayflower which honored the company's 25-year employees. Special honors were paid to F. A. Seiberling, 87-year-old chairman of the company, as its founder and charter member of the new 25-year club. Fifty-two other 25-year members were also honored, including Charles A. Reed, now assistant to the president, all receiving silver plaques, checks for $250 each, and an extra two weeks' vacation with pay.

Farrel Reopens Chicago Office

Farrel-Birmingham, Inc., Ansonia, Conn., has reopened its branch office in Chicago, Ill., locating at 120 South La Salle St., with Harry Temporal, who has had wide experience as sales representative in the numerous fields for which the company builds equipment, in charge of the office. Mr. Temporal has been connected with the company for 26 years, having first joined the Farrel Foundry & Machine Co. at Ansonia in 1910. He was formerly Chicago office manager, has been in charge of company branch offices at Cleveland and Akron, and has served in the sales departments at Ansonia and Buffalo, N. Y.

Wide Base Tire Rim Symposium

At a meeting of the New York Section of the Society of Automotive Engineers, held at the Hotel Pennsylvania, New York City, on November 21, G. M. Sprowls, of the Goodyear Tire & Rubber Co., Akron, and W. S. Brink, of the Firestone Steel Products Co., Detroit, Mich., were the featured speakers in a symposium on "Wider Base Tire Rims." Mr. Sprowls stated that test reports have indicated that the wider base rims permit tires to run at about 50° F. cooler under severe conditions than the narrower equipment. Pointing out that the wider base rim had been developed during the war as a means to conserve rubber, Mr. Brink said that the new standard, developed by the Tire & Rim Association, provides that the distance between flanges is held at 70% of the cross-section measurement of the tire under normal inflation pressure. General adoption of the wider base rims was forecast at the symposium.

OBITUARIES

Bowman S. Ellis, Sr.

Bowman S. Ellis, Sr., who had been associated with the latex sales branch of the Charles T. Wilson Co., 120 Wall St., New York 5, N. Y., for the past ten years, died on December 8 in the East Orange General Hospital, South Orange, N. J., at the age of 68. Born in Haddonfield, N. J., Mr. Ellis attended New Jersey public schools and entered the rubber business with Harry A. Gould forty years ago. In 1910, he founded his own company, B. S. Ellis Co., Inc., in New York City, and continued to operate it until 1928. He was a member of the Rubber Exchange and the Rubber Clearing Association. A widow, two sons, and a daughter survive.

George J. Reuter

George J. Reuter, manufacturer of a preserver for rubber accessories used in automobiles and an inventor of a puncture-proof inner tube for auto tires, which has been used extensively in the South, died at his home in Rahway, N. J., on November 13 after a long illness. He was 75 years old. Mr. Reuter was once president of the old Reuter Rubber Co., Paterson, N. J.

Fred Zonino

Fred Zonino, chief industrial engineer of the footwear division of the U. S. Rubber Co. at Naugatuck, Conn., died of a cerebral hemorrhage in the Waterbury Hospital in Waterbury, Conn., on December 1. He was 59 years old. Mr. Zonino had been associated with the company since 1903. A widow and two sons survive.

Sebrell Promoted by Goodyear

Appointment of Dr. L. B. Sebrell as director of research and chemical products development of the Goodyear Tire & Rubber Co., Akron, has been announced by Dr. R. P. Dinsmore, vice-president in charge of research and development for the company. In the change, which permits more effective coordination of the work of these two divisions, and provides for the better utilization of facilities and personnel, Dr. Sebrell will be directly responsible to Dr. Dinsmore. Dr. H. J. Osterhof, formerly assistant research director, has been appointed manager of the research department and Dr. C. W. Walton continues as manager of the Chemical Products Division, both of whom report to Dr. Sebrell. Appointed assistant managers of research are: Dr. A. M. Clifford, in charge of basic raw materials research activities; H. A. Endres, in charge of chemical products research; and J. A. Merrill, in charge of mechanisms and processes research, all of whom are responsible to Dr. Osterhof. I. D. Patterson has been named assistant manager of Chemical Products Development.

To Expand Titanium Plant

E. I. du Pont de Nemours & Co., Inc., has announced plans for a new manufacturing unit at its titanium dioxide plant at Edge Moor, Del. This unit, the second titanium expansion to be started since the end of the war, is not expected to be completed until sometime in 1948, since much of the equipment to be installed cannot be procured except under long-term delivery. Currently the plant's capacity is being increased through modification of existing equipment and processes. This phase of the expansion program, which was started last Spring, is scheduled for completion next May.

Conductive Rubber Committee

In anticipation of the increased use of conductive rubber, Technical Committee A of A.S.T.M. Committee D-11 on Rubber and Rubber-Like Materials, has organized a new committee to study the conductivity or resistivity of conductive rubber and to propose specification limits that are commercially practicable. S. R. Doner, of the Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., Passaic, N. J., is chairman of the new committee.

Producing Extruded Goods

F. E. Rice and M. W. Chadwick, both previously associated with the Firestone Tire & Rubber Co., recently formed the Rice-Chadwick Rubber Co., Inc., at Killbuck, Ohio, for the manufacture of extruded rubber goods, particularly for the automotive and electrical trades. The company presently employs 25 people and may possibly enter the molded goods field in the near future.

NEW RUBBER GOODS

Plow Contour Tractor Tire

A new "plow contour" tractor tire, which is said to feature 30% deeper bite and greatly increased traction and provide 30% longer wear, has been introduced by the Seiberling Rubber Co., Barberton, Ohio. The new tire has an entirely new curved, deep lug tread design that works on newly developed principles of traction. Each lug has a contour like the mold-board of a plow which scours and sheds the soil. Open center tread design is said to give the tire greatest possible flexibility so that it automatically cleans itself with every revolution of the wheel. According to the company, another advantage in the new tire is its resistance to side slip, which facilitates hillside and contour farming, providing better tractor control and reducing crop damage and rutting.

Universal Drain Cleaner

A new household accessory, known as the Universal Drain Cleaner, for cleaning drains in kitchen sinks, wash bowls, bath tubs and laundry tubs, is being marketed by O-B Distributors,

P. O. Box 270, Southgate, Calif. Made of neoprene, the cleaner is said to be resistant to oil and grease. The cleaner is marketed in a display carton which contains twelve units.

Royal Air Guard Tube

Development of a passenger car inner tube of waffle-like construction has been announced by the U. S. Rubber Co. to prevent rapid deflation in event of a puncture. The crown of the new tube is composed of a patchwork of square pockets which press against the inside of the tire as the tube is inflated. If the tube is punctured by a nail, this squeezing action crowds the rubber around the nail. Thus the tube loses air at a much slower rate, allowing the driver to proceed a greater distance before stopping for repairs. The new product, known as the U. S. Royal Air Guard tube, will be marketed at premium prices when OPA price approval is given. Butyl rubber will be used in the manufacture of the tube.

Rubber Link Floor Covering

Loewenthal Co., 188 West Randolph St., Chicago 11, Ill., has introduced a

new type of rubber link floor covering for industrial use which is similar to the small household link door mats. The company claims that actual tests have shown that workers standing on the new floor matting, known as the "L-Co," show noticeably less fatigue. The matting is sold by the square foot in any size. It can be custom fitted to odd-shape rooms and is also available as special purpose mats for work areas or as a wall-to-wall covering.

Sunbabe Rubber Dolls

Production of the Sunbabe line of jointed rubber dolls, which was stopped during the war, has been resumed by the Sun Rubber Co., Barberton, Ohio. Although the company is manufacturing three of their jointed rubber dolls, one of the chief bottlenecks is the difficulty of securing textiles for doll clothes.

Rubber acceptable for the dolls is likewise a critical item, and skilled workers are also in short supply. When this combination of situations is eased, more of the Sunbabe dolls are expected to make their appearances in America's playrooms.

Rubber Bowling Pit Mat

An all-rubber bowling alley pit mat that is said to leave no marks on the pins is being manufactured by the Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., Passaic, N. J. According to the makers, the new pit mat has already been acclaimed by bowlers as having many advantages over the conventional rope or coco mats. Shedding of hairs and dirt is eliminated and the new mat makes it unnecessary for the bowler to clean fuzz from his ball. The mat has no canvas, joints, glue, or stitching. It is made of an elastic compound which is said to provide good cushioning and sound-deadening properties.

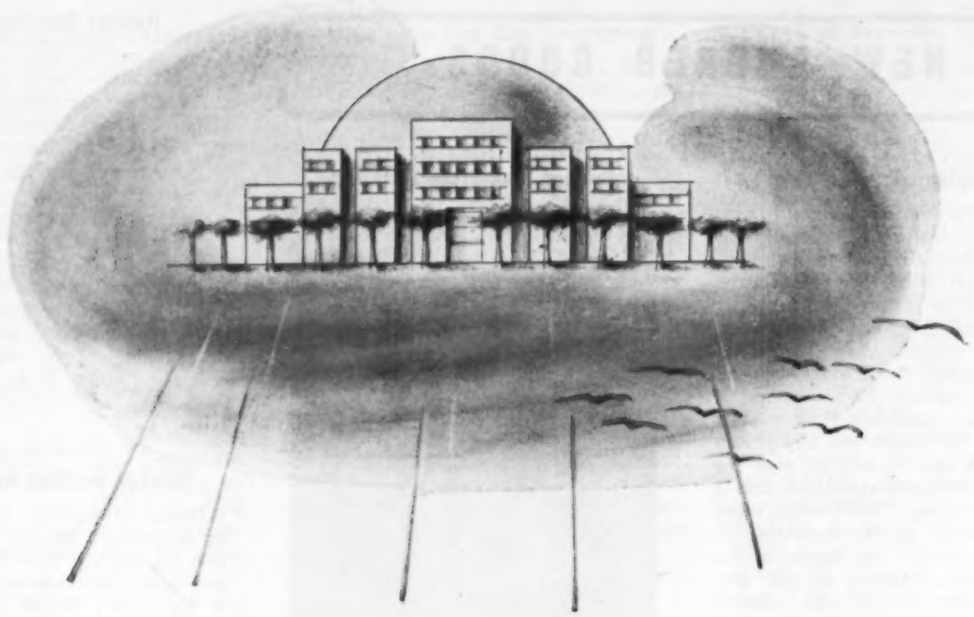
Rubber Molding and Color Kits

Hobby-Craft, Inc., toy manufacturers of Monmouth, Ill., has resumed production of its full line of rubber molding and color kits for making art models in the home, school or summer camp. Each kit contains molding powder, numerous rubber molds and water colors. A perfect reproduction of a model taken

either from history, art or nature is obtained by mixing some molding powder with cold water to a creamy mixture and pouring it into a rubber mold which is then permitted to dry for half an hour. No heat, acids or sharp tools are necessary. Included among the six kits produced by the company is one of a complete Indian village.

New Air-Conditioned Pillow

A new type air-conditioned pillow, made from shredded foam rubber and said to be ideal for persons suffering from allergies, has been placed on the market by the recently established Interstate Latex Co., Youngstown, Ohio. Known as SlumberAir, the new pillow is made of Airfoam, the foam sponge rubber material produced by the Goodyear Tire & Rubber Co. The pillow is claimed to be odorless, dustless, verminproof, and resistant to lumping and shifting of the material. It is marketed in standard and twin bed sizes.



Dream Hospital...

The hospital depicted here exists only in the hearts of men and women who are losing the grim battle with cancer. And in the imagination of other men and women who want desperately to provide a haven for these victims in need of hope and care to sustain them in the few months or years still remaining to them.

Actually, there is not a single such hospital anywhere devoted exclusively to these unfortunates who *may* be beyond the help of medical sciences, but who are still certainly in urgent need of hospital care. And only a limited, woefully insufficient number of beds available to them in other hospitals.

During the long years of the war we gave up our plans for the building of this dream hospital... **Hope Institute.**

But now we are more than ever determined to see it rise in stone and steel. A model hospital, the first of its kind ... cheerful and comfortable in every way ... with more the atmosphere of an apartment hotel than of a cold institution. Where the patients, depending upon their condition, can enjoy the warm hospitality of lounge and dining room, or retire to the merciful seclusion of a private room.

What do we need to build this hospital now? **You.** Every dollar or penny you can scrape together for it. Whether or not you know this tragedy from bitter personal experience ... the tragedy of whole families, endlessly frustrated in their determination to care for a doomed member ... give as generously as you can. Please fill out the coupon below and mail with your contribution. It will make this hospital more than a dream.

NCF

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GRIFFIN BUILDING
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ADDRESS _____

Make checks payable to Abbott Kimball, Treasurer of the National Cancer Foundation.

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THE NATIONAL FOUNDATION FOR THE CARE OF ADVANCED CANCER PATIENTS

NEW EQUIPMENT

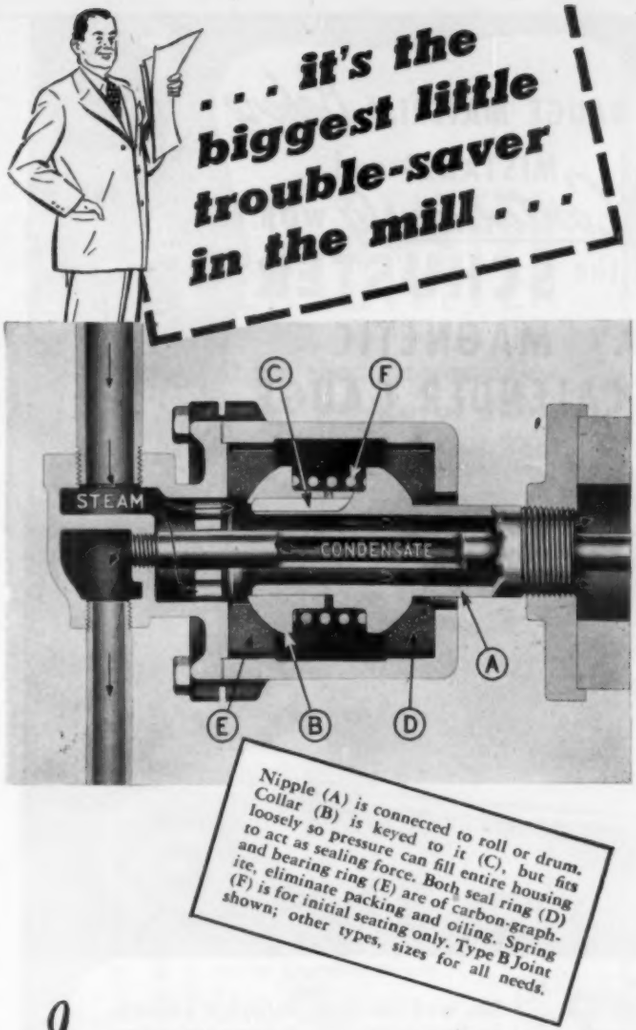
Measuray Gaging Instrument

A gaging instrument, which utilizes a new X-ray and electronic application for non-contact, continuous, or spot checking of thicknesses of rubber, plastics, and other moving materials, is being manufactured by the Sheffield Corp., Dayton, Ohio. The new instrument, called the "Measuray," is said to be applicable to almost

any production process where it is desired to measure and regulate the thickness of material. The manufacturer claims that accuracy can be held to better than 1% of material being checked if required.

According to the company, tolerance and thickness limitations are dependent to some extent on the density of the material to be checked. Precise accuracy is maintained regardless of whatever changes may occur in the product. Speed of movement of material, whether at the rate of 5 feet or 5,000 feet per minute, is said to have no effect on the accuracy of the Measuray. Neither does the temperature of the room, nor of the stock. For example, sheets or strips coming hot from the rolls give the same indication on the Measuray when cooled to room temperature. Day after day uniform readings are reported to be obtainable because of the in-built stability of the system employed.

The Measuray utilizes masters of the same material to be checked for set-up and operating purposes. It is a comparator, since it compares the thickness of material with a sample of the same material which has the required known dimension. The variations of thickness are indicated in percentages. Standard units are equipped with indicating mechanisms, while recording and machine control devices are available. No contact is required with the material to be gaged, and in some cases the nearest approach of any mechanical part of the instrument can be many inches away. Tests can be made at various points in the process to control any operation.



Nipple (A) is connected to roll or drum. Collar (B) is keyed to it (C), but fits loosely so pressure can fill entire housing to act as sealing force. Both seal ring (D) and bearing ring (E) are of carbon-graphite, eliminate packing and oiling. Spring (F) is for initial seating only. Type B Joint shown; other types, sizes for all needs.

In terms of physical size alone, the Johnson Joint could hardly be called big machinery. But in its ability to save time and trouble, and promote plant efficiency, its stature approaches anything the industry has ever seen.

The Johnson Joint was designed to go after the old stuffing box and steam fit troubles in a business-like way, and it literally knocks the stuffing out of them. There's no packing of any kind. There's no oiling required, ever. There's no adjusting — the higher the pressure, the tighter the seal. There's little to fear from misalignment — with provision for both lateral and angular movement built right in. Note besides how neatly it provides for more efficient syphon drainage, through the same head that admits the steam.

In dollars and cents, what does all this add up to? Well . . . enough at least to pay the cost of switching over to Johnson Joints in just a short while. Enough certainly to make the Johnson Joint too big to overlook.

THE JOHNSON CORPORATION
868 WOOD STREET, THREE RIVERS, MICHIGAN

JOHNSON Rotary Pressure JOINTS

Write for literature and the name of your nearby Johnson representative.

No, lock the door *before* it's stolen. In this case, "it" means accuracy, production and profit. . . . Since 1927 the Schuster Magnetic Calender Gauge has consistently served four important ends:

1. It assures uniform thickness in your finished product, down to 1/1000".
2. It makes hand-miking unnecessary, saving time and expense.
3. It does away with the human equation, *preventing* mistakes.
4. It saves the stock sampled for calender testing.

The Schuster Gauge does these things by the simple expedient of setting rubber calender rolls to a desired thickness and holding them there. More lately, it has showed itself just as indispensable as "insurance" to synthetic rubber, plastics, cellulose and other materials. The instrument is simple in design, rugged in construction, practically without wearing parts, and adjustable to any thickness.

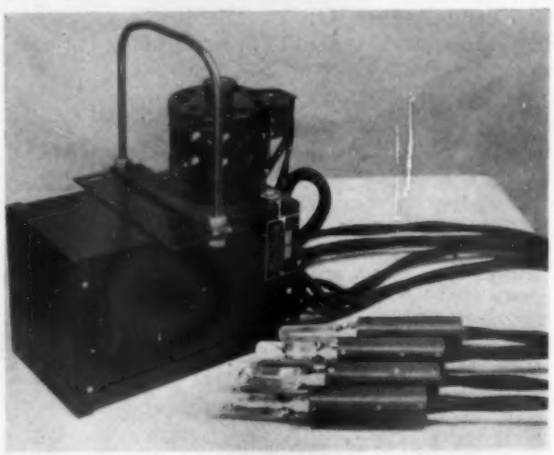
There is no "stock recipe". Every installation must be engineered to the job. May we tell you what the Schuster Magnetic Calender Gauge can do for you?

Write for our Bulletin "A"

THE MAGNETIC GAUGE COMPANY
60 EAST BARTGES STREET AKRON 11, OHIO
— SALES REPRESENTATIVES —
Eastern: BLACK ROCK MFG. CO., Bridgeport, Conn.
Western: H. M. ROYAL, Los Angeles, Calif.

Sta-Warm Low Voltage Hot Knife

An electrically-heated knife with thermostatically controlled temperatures up to 1200° F. for use in trimming molded rubber products, such as hot water bottles, and in fabricating operations with thermoplastic materials has been developed by the Sta-Warm Electric Co., Ravenna, Ohio. Operated from 110 volts a.c., 60 cycle current supply, drawing 250 watts maxi-



mum, the knife is said to be of greatest use where the heat requirements are either of an intermittent type, or are of moderate continuous type.

For limited wattage, the normally dull edges of the 2½-inch long by 1-inch wide by 1/16-inch thick blade are filed to produce a V-edge along the sides and tip of the blade; not to produce a sharp cutting edge, but to provide an entering wedge through which the generated heat will pass more easily to the material being trimmed. If the application requires intense heat, the hot knife will not serve the requirements. If, however, a particular operation requires intermittent application of a red hot blade, the tool serves a useful purpose. The blade temperature can be increased to a cherry red heat by filing down the blade to less width, thus increasing the electrical resistance at the point filed, and causing it to become hotter than the rest of the blade. The blade can also be bent or curved by the operator to practically any angle or curvature to enable the tool to meet a given application.

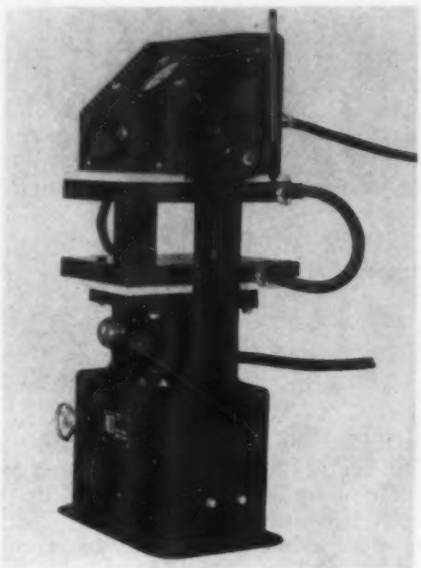
SOFTENERS and PLASTICIZERS
For RUBBER
From the Pine Tree

ROSIN OIL
PINE TAR
BURGUNDY PITCH
GALEX a non-oxidizing RESIN
Send for **"Pine Tree Products"** *Booklet*

NATIONAL ROSIN OIL & SIZE CO.
R. K. O. BUILDING, RADIO CITY, NEW YORK, N. Y.
Plant: Savannah, Ga. Branches in Principal Cities
"PIONEERS OF THE INDUSTRY"

Modified Preco Hydraulic Presses

To meet a growing demand among users of Preco Hydraulic Presses for a wide range of production and industrial testing uses, Preco, Inc., 960 East 61st St., Los Angeles 1, Calif., has announced a list of important modifications for the press. The Preco



Press, a bench type unit which develops 40,000 pounds of pressure, and which is equipped with a two-stage hydraulic pump, is now available with platens measuring 8¼ inches by 12 inches. These are furnished either with 1500-watt electrical heating elements, which give fast heat acceleration, or for steam heating. The company also has announced that where hydraulic system pressure is available the press can be supplied to hook into such a system. Triple platens which double the capacity of the press by permitting work to be inserted above and below an intermediate platen are available for the new press as well as the standard 8-inch by 8-inch size.

REMOVE THE NERVE WITH PHILBLACK A

FOR FURTHER DETAILS, SEE AD ON PAGE 256

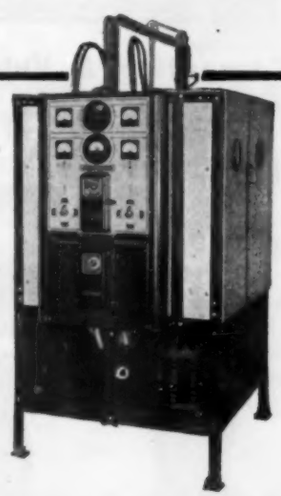
The

WEATHER-OMETER

. . . . is used by these companies to test the resistance of their products to the destructive effect of weathering . . .

- ★ B. F. Goodrich Company
- ★ Prismo Laboratories
- ★ K. Sonneborn Sons, Inc.
- ★ United States Rubber Company
- ★ United States Testing Company
- ★ Tennessee Eastman Corporation
- ★ Aridye Corporation
- ★ American Cyanamid Co.
- ★ Chance Vought Aircraft
- ★ Collyer Insulated Wire Co., Inc.
- ★ Congoleum Nairn, Inc.
- ★ Phillips-Petroleum Co.
- ★ Pacific Mills
- ★ Nox Rust Corporation
- ★ National Bureau of Standards (Chemistry Bldg.)
- ★ National Bureau of Standards (Textile Bldg.)
- ★ U. S. Naval Clothing Depot
- ★ U. S. Navy Yard
- ★ U. S. Marine Corps
- ★ U. S. Naval Hospital

and hundreds of others



The Weather-Ometer brings weathering conditions right into your laboratory. A few weeks testing with controllable cycles of light, water spray, and selected temperature and humidity equals years of actual outdoor exposure. The Weather-Ometer is safe to operate automatically 24 hours a day without attention.

Used all over the world — Atlas Weather-Ometers, Launder-Ometers, and Fade-Ometers.

ATLAS ELECTRIC DEVICES CO.

361 WEST SUPERIOR STREET, CHICAGO 10, ILLINOIS

4-M GUILLOTINE CUTTER

The use of the BLACK ROCK 4-M GUILLOTINE CUTTING MACHINE for Cutting running rubber or synthetic stock to length, reduces costs for greater profits. Can be synchronized with Mill, Calender, or Tubing machine.

There is a Black Rock Cutting Machine to meet your requirements.

WRITE FOR FULL PARTICULARS.

FINE BR TOOLS

BLACK ROCK MFG. CO.

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HOGGSON BRAND

Since 1849

Cementing & Vulcanizing Tools

HUNDREDS OF DESIGNS —

Scores of standard tools carried in stock for working rubber, leather, plastics, paper, cement, etc. Special tools made to your order. Also—steel letters, figures, stamps, dies and molds. Explain the job, we'll suggest the tool.

HOGGSON & PETTIS MFG. CO.

141A Brewery St., New Haven 11, Conn.

Rubber Floor Tiling Cutting Machine

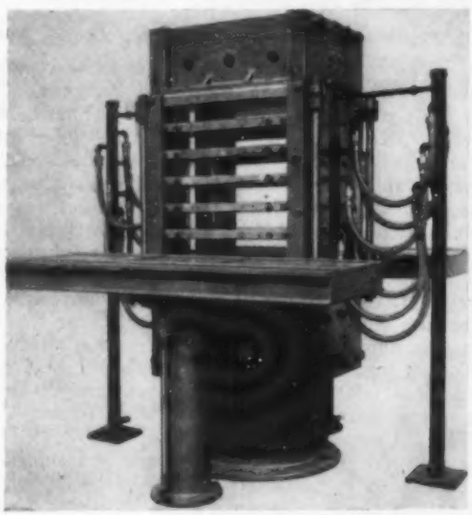
A machine which cuts rubber or plastics floor tiling into blocks four inches square up to twenty-four inches square, in graduations of one inch, has been developed by the Campbell Machine & Development Co., 1734 Front St., Cuyahoga Falls, Ohio. Known as the Campbell Model 72 Rubber Floor Tiling Cutting Machine, it is said to hold a sheet with a maximum width of 72 inches. The tiling is placed on the bed of the machine and electrically-operated rollers move the stock to a position under a cutting bar. The bar clamps the sheet into position while a power-driven knife-head cuts the tile to the size required. The machine is also reported to cut oblong blocks within the four-inch to 24-inch square range. In tests, the machine has cut tile up to one-fourth inch thickness. It is said to take either roll or block tile and to cut feature or border strips to a maximum of six feet in length.

Zimmerman Zim Cutter No. 3

A new cutting tool, which has been developed especially for rubber and plastic manufacturers, is being produced by the Zimmerman Packing Co., Cincinnati 12, Ohio, for cutting soft rubber materials and plastics to exact lengths and measurements. The new tool, known as the Zim Cutter No. 3, will cut sponge rubber, soft rubber tubing, gum rubber, rubber gloves, hose, and plastics of odd shapes up to six inches in width and one inch in thickness. The cutter is available in two types: Type E is for regular cutting, while Type F is completely equipped with an adjustable measuring device, which can be quickly set to any desired length.

Multiple-Opening Platen Press

A new 285-ton multiple-opening platen press, which can be operated at pressures up to 1500 p.s.i., has been introduced by the R. D. Wood Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Penna., for laminating and polishing plastics sheets and curing rubber products. The side slabs are locked to the top

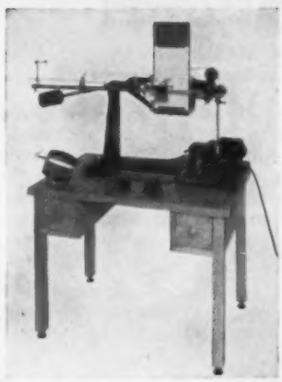


platen and cylinder casting by means of keyed joints and bolts, while steel tie rods, shrunk into position at assembly, assure a rigid, compact unit. Platens can be either steam or electrically heated and are 30" x 30" x 2" in size. Guide blocks, securely bolted to the moving press platen, slide on vertical guides attached to the inner face of each side slab. This is claimed to assure positive guiding of the platen over the full stroke of the press. The intermediate platens are guided at each corner on steel guide strips and are spaced, by stepped-type hangers, with four-inch daylight between each platen when the press is in open position. Provision is made for spacing the platens with two and one-half-inch daylight when required. The press can be furnished with or without elevators.

FOR GOOD ABRASION RESISTANCE
USE PHILBLACK A

FOR FURTHER DETAILS, SEE AD ON PAGE 256

LABORATORY PRECISION
Plus
PRODUCTION-TESTING STAMINA



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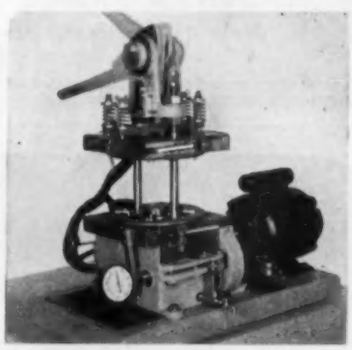

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BUTALASTIC POLYMERS

Their Preparation and Applications
A Treatise on Synthetic Rubbers

By FREDERICK MARCHIONNA
Patent Office, U. S. Dept. of Commerce

This detailed treatise records the progress achieved during the last ten years in the chemistry and applications of all types of synthetic rubbers. Not only does the book present a connected treatment of the scientific principles involved in the synthesis, manufacture and use of these products, but in addition it is copiously documented with literature and patent references.

The author is a member of the staff of the United States Patent Office and has had years of experience in the literature of natural rubber, latex and synthetic polymers.

This book will be vitally important for all workers in these expanding fields; to organic chemists, rubber and plastics technologists, development engineers and patent attorneys. It will undoubtedly be a standard reference book for many years to come.

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REVIEWS

BOOKS

Butalastic Polymers: Their Preparation and Applications. By Frederick Marchionna. Published by the Reinhold Publishing Corp., 330 West 42nd St., New York 18, N. Y. 6 x 8½ in. 642 pp. $8.50.

(Available from Book Department, RUBBER AGE)

Any review of this book, easily the most comprehensive one published to date on the subject of synthetic rubber, obviously must start with a clarification of the term "butalastic polymers." Hence, the following: As the author points out in his introduction, a true synthetic rubber would be a polymer of isoprene which would have the elasticity, resilience, chemical reactivity and other characteristic properties of vulcanized or unvulcanized rubber. Although synthetic rubber from isoprene has been produced, the best rubber-like substances which have been synthesized and which are now under development are derived from a variety of monomeric substances, alone or in admixture with other compounds.

Although numerous terms have been applied by various investigators to the rubber-like materials, the best suggestion for a rational classification of the commercially-known materials was advanced by Fisher (*Ind. Eng. Chem.*, Vol. 31, p. 941, 1939). Under the term of "elastoprenes," Fisher grouped all the polymers derived from butadiene and substitute butadiene compounds in which one or more of the hydrogen atoms in the carbon chain compounds would be replaced with alkyl, aryl, or cyano groups, or a halogen, etc. This classification, however, excludes the copolymers and interpolymers of butadienes with different polymerizable monomeric compounds, some of which are acquiring great commercial and economic importance. While Fisher's suggestion is the best advanced so far, in the author's opinion it does not scientifically describe the source of the raw materials.

In view of the above, Mr. Marchionna has grouped the "elastoprenes" as advanced by Fisher with the copolymers obtained from the monomeric compounds producing these elastoprenes and with other polymerizable monomeric substances having different structures, calling the entire group "synthetic butadiene elastics." At first it was felt that the term "synbu-lastics" should be applied to this group, but since obviously such a term is not phonetic, it was eventually decided to call the group "butalastic polymers." Credit for this decision is given by the author to both Dr. Ernst A. Hauser and Dr. Gustav Egloff. In brief, the term "butalastic polymers" is used to describe and discuss the elastic or plastic polymers of a butadiene compound, with or without other compounds polymerizable with it. An elaborate scheme of classification is used in the book to name all known butalastic polymers.

Seventeen separate groups of "butalastic polymers" are treated with in the book covering the history of the development of these products; the source and production of the raw materials used for forming them; the mechanism of polymerization; the methods of polymerization and copolymerization or interpolymerization of the various compounds; the compounding practice, industrial application, and cure of the polymers; the properties and testing of the products; the reclaiming of butalastic scrap; and derivatives of the butalastics. All sections are copiously documented with literature and patent references, with excessive care given to an impartial and clear discussion of the real advances made in the preparation and use of the materials, rather than to the claims.

Divided into three parts, and exhaustively indexed, the book consists of 19 chapters, as follows: (1) Historical Retrospect; (2) Source and Production of Monomers; (3) Halobutadienes Production; (4) Mechanisms of Polymerization Processes; (5) Polymerization of Isoprene; (6) Polymerization of Dimethylbutadiene; (7) Polymerization of Butadiene; (8) Copolymers and Interpolymers of Butadiene; (9) Photochem-

ical Polymerization; (10) Polymerization of Haloprenes; (11) Butalastic-H Interpolymers; (12) Butalastics-3-Heteropolymers; (13) Processing and Industrial Applications of Butalastics; (14) Compounding and Vulcanization of Butalastics; (15) Plastic and Fluid Butalastics Compositions; (16) Filming, Extruding, Coating, and Laminating; (17) Miscellaneous Articles; (18) Properties of Butalastics; (19) Butalastics Derivatives. In addition to the author and subject indexes, there is also an index covering catalysts of polymerization.

The author of this comprehensive treatise on synthetic rubbers, Mr. Marchionna, is a member of the staff of the U. S. Patent Office and author of "Latex and Its Industrial Applications." He has had years of intimate acquaintance with the literature of natural rubber, latex and synthetics, all of which is reflected in his present work. The work, incidentally, was prepared under the advice and guidance of Dr. Loren B. Sebrell, director of research of the Goodyear Tire & Rubber Co.

•

Plastics Business. By Herbert R. Simonds and Joseph V. Sherman. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. 6 x 9 in. 448 pp. $5.00.

As indicated by its title, this book deals primarily with the business and statistical aspects of the rapidly growing plastics industry. It analyzes the business not only of the recognized plastics materials but of many associated items in closely related fields, such as chemicals, synthetic rubber, plywood and paint. The operations of most companies in the plastics field are described, those of the manufacturers of resins and molding powders as well as those fabricating finished plastics articles. All the financial and statistical information is arranged in convenient tables, covering income statements and financial reports of each company, the tonnage production and growth of the industry, and the prices of plastics and equipment. A glossary of the trade names used in the plastics field is another feature of the book. There are 15 chapters in all, one of which is devoted entirely to synthetic rubber, as well as a subject index.

•

Research in Canada. Published by Imperial Oil, Ltd. Available from the Chemical Institute of Canada, 18 Rideau St., Ottawa, Canada. 6 x 9 in. 160 pp.

At the first annual conference of the Chemical Institute of Canada, held in Quebec in June, 1945, Imperial Oil sponsored a symposium on "Research in Canada." This book contains all of the papers, as well as subsequent discussions, presented at that symposium. There are eleven papers in all included in the booklet, and in total they give what is probably the clearest general picture which has so far been developed of scientific research in the Dominion. They cover the coordination of scientific research, role of the universities in research, government-sponsored research, research and invention in the law of patents, technical enterprise in the United Kingdom, the part of industry in research, and scientific research in business. Each of the papers was presented by an outstanding Canadian authority.

•

The History and Romance of Elastic Webbing. By Clifford A. Richmond. Published by Mr. Richmond. Available from the Easthampton News Co., Easthampton, Mass. 6 x 9 in. 218 pp. $1.50.

The romantic history of the elastic webbing industry is put between covers for the first time in this interesting book. Starting with the work of Luther Clark in Northampton, Mass., and his collaboration with the famous Charles Goodyear, the book traces the development of the art of combining rubber and yarn to form satisfactory elastic fabrics. It is replete with names, dates and places, with an occasional personal anecdote thrown in to lift the story from the pure statistical. Since the Author, Mr. Richmond, is chairman of the board of the United Elastic Corp., and has devoted virtually his entire life to the elastic webbing trade, few other individuals could have written this book so well or so complete.

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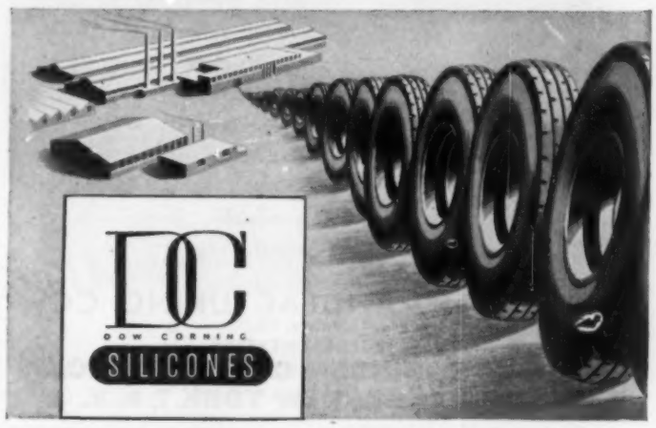

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Elastomeric Engineering. Published by Andre Rubber Co., Ltd., Kingston By-Pass, Surbiton, Surrey, England. 7½ x 10 in. 168 pp. Price: One Guinea (approximately $4.50).

Prepared for the practical use of engineers, this book is a useful guide in the manufacture and application of rubber-to-metal units of all kinds. In addition, it serves to give the reader some background on rubber itself, the first few chapters being devoted to preparation of raw natural rubber, manufacture of synthetic rubber, compounding and processing of natural and synthetic rubbers, and properties of these rubbers. The greater portion of the book is concerned with rubber-to-metal bonding, including chapters covering the following specific subjects: bonding rubber to metal; properties of the rubber-metal bond; testing and design of bonded units; design of molding equipment; design formulae and calculations for bonded rubber units; and rubber in chemical engineering. Some information on Andre products and their applications in industry, as well as data on the company's research and development facilities, is included. One chapter is devoted to an explanation of some of the terminology employed in the rubber field.

•

Where to Find Information on the German Chemical Industry: A Bibliography. By L. Wilson Greene, 54D Oak Grove Drive, Baltimore 20, Md. 6 x 9 in. 48 pp. $1.00.

For more than a year technical information concerning the German chemical and process industries has been flowing into the United States in the form of hundreds of reports. These are being made available to the public by the Office of Technical Services of the Department of Commerce, and numerous articles on various phases of the industry are appearing in scientific and technical periodicals. This booklet is intended to serve as a guide to this wealth of information. The selected bibliography presented is divided into two main sections. The first is a list of published articles and the second is a list of what the author judges to be the most important reports which can be purchased from the Office of Technical Services. A subject index is included at the end of the pamphlet. A similar guide to the literature of the German metallurgical industry is planned for the near future.

•

Rubber Compounding Materials. (Laboratory Release No. 3.) Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 8½ x 11 in. 24 pp.

Physical test data, including tension, tear resistance, abrasion resistance, compression set, resilience, and hysteresis, on two GR-S-channel black stocks incorporating the company's softeners is presented in this technical bulletin. The first test shows a comparison of the behavior of P-10, P-25, and RS grades of Cumar in a GR-S-channel black stock, while in the second test the behavior of Bardol, B. R. V., and Dispersing Oil No. 10 are compared. The recipes selected represent a basic type, comparatively low in channel black and high in softener content, thus emphasizing the effect of the softener on the elastomer.

•

Pittsburgh Color Dynamics. Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh 19, Penna. 8½ x 11 in. 64 pp.

This booklet is actually a reference manual dealing with the origin, development and application of the principles of color dynamics, which, in simpler language, means the scientific utilization of the inherent energy in color to promote efficiency, safety and happiness. It outlines what color is, the various characteristics of color, and where, when, why and how color should be used. Considerable attention is paid to the use of color for industry.

Differentiation of Rubber and Gutta Hydrocarbons in Plant Materials. By S. B. Hendricks, S. G. Wildman, and E. J. Jones. Issued by the Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md. 6 x 9 in. 12 pp.

Reprinted from the *Archives of Biochemistry,* this report covers the work undertaken to determine whether certain polymerized hydrocarbons isolated from various plants can be designated as being either rubber or gutta, and to provide an initial approach to the biochemical problem as to the manner in which such polymers are made by plants. Since chemical reactions were found to be of little value in identifying the isomers because the same end products were obtained when the double bonds of the molecules were destroyed, the investigators employed a non-recording spectrograph for infra-red transmission measurements. The results indicate that the hydrocarbons of the rubber or gutta isolated from a variety of plants, including *Hevea brasiliensis, Mimusops balata,* and *Asclepias erosa,* can be positively identified by their light absorptions near 12μ. Mixed *cis-* and *trans-*isomers were absent in all cases even though the plants examined were selected as giving hydrocarbon polymers of questionable types.

•

Cabot Carbon Blacks for Rubber. By Fred H. Amon. Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass. 8½ x 11 in. 8 pp.

This is the first of a new series of technical bulletins to be issued by Cabot. It treats with the types, grades, properties and uses of the company's blacks for the rubber field, including channel and furnace types. Some of the fundamental differences between natural and synthetic rubber, which affect types and grades of carbon blacks used, are discussed, with recommendations made for use of Cabot products in specific types of products. Included with the bulletin is a table classifying all carbon blacks by groups, brand names, manufacturers and uses.

•

Time Controls. Automatic Temperature Control Co., 34 East Logan St., Philadelphia 44, Penna. 9 x 11 in.

This is a specially prepared brochure on the subject of applying automatic time controls to molding presses. It contains technical articles written by engineers on specific design problems, as well as data on selection of equipment, electrical circuits, and the like. The company's time controls can be utilized on such operating devices as motors, valves, solenoids, relays, signals and heaters.

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, DEC. 11, 1946

Natural Rubber

CONTRARY to expectations, the subject of world-wide resumption of free trading in natural rubber does not seem to have been on the agenda of the third meeting of the International Rubber Study Group which was held at The Hague in Holland the week of November 25. It was indicated, however, that France is planning to restore free trading along the lines of that established by Great Britain, with direct imports permitted after the first of the year. The Dutch are also expected to install similar free trading procedures as soon as the political disturbances in Indonesia are settled.

It now seems fairly evident that the resumption of free trading insofar as the United States is concerned will not take place for many months to come. It was brought out at the Holland conference that although some 1,200,000 long tons of natural rubber may reach consuming areas in 1947, only some 500,000 tons will reach the United States. Based on this situation, several sources are urging that free trading in this country be delayed until natural rubber is in adequate supply, since free trading in a tight supply market could only result in speculation and higher costs. Higher prices offered for natural rubber at present, it is argued, could not possibly produce more rubber.

Reports from Malaya indicate that natural rubber, in the new so-called free market, is being offered and bought for 20¼ cents per pound, plus or minus one-quarter of a cent. Similar quotations are indicated on the newly-opened London Rubber Exchange. Dealings on the London Exchange, incidentally, are currently confined to futures, since traders will not be permitted to import rubber until January 1.

Prices shown below are those established by the Office of Rubber Reserve:

Plantations—	
Ribbed Smoked Sheets, No. 1X	.22½
Thick Pale Latex Crepe, No. 1X	.22½
Thin Pale Latex Crepe, No. 1X	.22½
Thick Brown Crepe, No. 1X	.21⅜
Thin Brown Crepe, No. 1X	.21⅜
Thick Remilled Blankets, No. 1	.21⅜
Thin Brown Remilled Crepe, No. 1	.21¼
Rolled Brown or Flat Bark	.18
Smoked Blankets, No. 1	.21¼
Claro Brand 1XRSS	.22½
Sole Crepe Trimmings	.22
R.C.M.A. Wtmkd. Crepe No. 16	.26⅜
Sole Crepe	.22½
Wild—	
Uncut Fines, Crude	.15
Cut Fines, Crude	.15½
Cut Fines, Washed & Dried	.22½
Islands Fine, Crude	.14¾
Weak Fine, Crude	.14½
Cameta, Crude	.09¾
Upriver Coarse, Crude	.12¾
Manicoba, Crude	.12¼
Caucho Ball, Crude	.11¾
Panama Slab, Crude	.09¾
Mangabiera, Crude	.08½
Cameroons, Crude	.16¼
Guayule—	
Carload Lots	.17½
Less-than-Carload Lots	.18
Latex—	
Normal, Tank Car Lots	.26
Normal, Carload Drums	.28¼
Normal, Less than 1 Drum	.35¼
Centrifuged, Tank Car Lots	.27¾
Centrifuged, Carload Drums	.29¼
Centrifuged, Less than 1 Drum	.36½

Scrap Rubber

Although the scrap rubber market has continued weak and unsatisfactory since our last report, due in large measure to the lethargic condition of synthetic scrap, dealers report a slightly improved attitude on the part of the reclaimers with regard to accepting some shipments of synthetic scrap. This situation is expected to improve still further in the near future, since many reclaimers are now shipping synthetic reclaim in carload lots and rubber manufacturers have indicated that they are fairly well satisfied with the quality and performance of such reclaim. The export market for scrap rubber is said to be picking up considerably, with large scale exports being made to the Far East. No price changes have been reported since our last issue. Current quotations follow:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$20.00
Beadless truck tires	ton	26.00
Mixed truck tires	ton	20.00
Beadless passenger tires	ton	26.00
No. 1 passenger peelings	ton	52.25
No. 1 truck peelings	ton	52.25
No. 2 passenger tubes	lb.	.07¾
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06¾
Mixed passenger tubes	lb.	.06½
No. 2 truck tubes	lb.	.07½
Red truck tubes	lb.	.07¼
Black truck tubes	lb.	.06½
Buffings	ton	35.00
Bicycle tires	ton	15.00
Air bags and water bags	ton	15.00
Boots and shoes	ton	33.00

Cotton Tire Fabrics

Although some improvement is reported in the supply of chafer fabrics, the tire fabrics continue in tight supply. According to one prediction made recently the production of tires at a faster rate than tire cord, both rayon and cotton, will bring about a drastic shortage of the cord by spring. Inability of the tire industry to secure sufficient quantities of cords is expected to prevent the industry from attaining its projected goal of 100,000,000 units next year. The industry can use about 15% more poundage than the combined output of rayon and cotton cord producers. No changes in prices have been recorded since our last report. Current quotations are indicated below:

Standard, Peeler, 12/4/2	lb.	.7405
Standard, Peeler, 14/4/2	lb.	.7542
Standard, Peeler, 16/4/3	lb.	.7680
Extra Staple, Peeler, 12/4/2	lb.	.8370
Extra Staple, Peeler, 14/4/2	lb.	.8508
Extra Staple, Peeler, 16/4/3	lb.	.8646

Chafers

14.4 oz (per sq. yard)	lb.	.7159
9.25 oz. (per sq. yard)	lb.	.7445
11.65 oz (per sq. yard)	lb.	.6444
8.9 oz. (per sq. yard)	lb.	.6873

Sheetings

48x40	36 in.	5.50	yd.	—	@13.276
40x40	36 in.	6.15	yd.	—	@11.890
40x36	36 in.	6.50	yd.	—	@10.723
48x48	40 in.	2.50	yd.	—	@27.594
48x48	40 in.	2.85	yd.	—	@23.075
56x60	40 in.	3.60	yd.	—	@19.229
48x44	40 in.	3.75	yd.	—	@18.830

Cotton

The price of middling uplands on the Cotton Exchange has swung in the wide range of 195 points since our last report (November 12), high for the period being 32.85 on December 11 and low 30.90 on November 21. The average price for middling uplands for the month of November was 31.50, based on 23 trading days. Despite the unsettling influence of the coal strike and the resulting railroad freight embargo, which caused prices to fluctuate with a succession of favorable and unfavorable reports, the market showed an upward trend throughout the period. Leading factors contributing to the rise of prices were the strong statistical position of the staple, continued foreign demand for American growths, reportedly by France, Italy, Czechoslovakia, Great Britain, India, and China, and expectations that private trade with Japan and possibly Germany would reopen in the spring. The final crop report of the Department of Agriculture for 1946 estimated a cotton crop this year of 8,482,000 bales, which is about 5,000 bales less than was forecast a month ago, and which compares with a crop of 9,015,000 bales in 1945. This short supply of cotton is expected to maintain prices at current or even higher levels. Quotations for middling uplands on the Exchange follow:

	Nov. 12	December 11		
	Close	High	Low	Close
March	30.25	31.75	31.23	31.75
May	29.61	31.23	30.71	31.23
July	——	30.17	29.39	30.17

Reclaimed Rubber

Demand for reclaimed rubber continues at the high levels maintained for the past several months. According to latest R.M.A. figures, consumption of reclaim in September amounted to 23,732 long tons, with consumption for the first nine months of the year amounting to 200,739 tons, an increase of 12.15% from the 178,998 tons consumed in the first nine months of 1945. Increasing shipments of carload lots of synthetic reclaim are reported throughout the trade, with rubber manufacturers reported to be quite satisfied with the quality and performance of such reclaim. With increasing quantities of natural rubber available, reclaimers look forward to still further demand in the coming year. No price changes have been reported. Prices shown below are those on typical grades of natural rubber reclaim:

Shoe				
Unwashed	lb.	.08	@	.08¼
Tube				
Black Tube	lb.	.12¼	@	.12½
Red Tube	lb.	.13	@	.13¼
Tires				
Black (acid process)	lb.	.08½	@	.08¾
Black, selected tires	lb.	.07½	@	.07¾
Truck, Heavy Gravity	lb.	.09½	@	.09¾
Miscellaneous				
Mechanical blends	lb.	.05½	@	.06½
White	lb.	.14	@	.14¼

Ducks

Enameling (single filling)	lb.	—	@	69.750
Belting and Hose	lb.	—	@	67.166
Single filling, A grade	lb.	—	@	63.000
Double filling, A grade	lb.	—	@	67.000

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CURRENT MARKET PRICES

Of Rubber Chemicals and Compounding Ingredients

DECEMBER 12, 1946

Prices are, in general, f.o.b. works.
Range of prices indicates grade or quantity variations.
All trade or brand names are set off in quotation marks.
Abbreviations: bbls., barrels; c.l., carlot; l.c.l., less than carlot; dlvd., delivered; t.c., tank cars; min., minimum; dms., drums; cyl., cylinder.
[a] East of Mississippi.

—The arrangement of this section follows closely the Chemical Section of the 1945 RUBBER RED BOOK to which readers are referred to determine the classification of any material or brand name.
—Although suppliers of every material were contacted for price information, only those materials are listed for which quotations have been furnished us. The quotations are not guaranteed and prospective purchasers should contact suppliers for confirmation before placing orders. Suppliers are requested to send us regularly current prices on all of their materials used in the rubber industry.
—All requests for information or listings should be sent to Market Editor, RUBBER AGE, 250 West 57th St., New York 19, N. Y.

ACCELERATORS

"A-1"	lb.	.28	.33
"A-10"	lb.	.36	.42
"A-19"	lb.	.52	.58
"A-77"	lb.	.42	.55
"A-100"	lb.	.42	.55
"Accelerator No. 8" (dlvd.)	lb.	.63	.65
"Accelerator No. 49"	lb.	.40	.42
"Accelerator No. 89" (dlvd.)	lb.	——	1.20
"Accelerator No. 122" (dlvd.)	lb.	——	1.30
"Accelerator No. 552" (dlvd.)	lb.	——	1.63
"Accelerator No. 808" (dlvd.)	lb.	.59	.61
"Accelerator No. 833" (dlvd.)	lb.	1.13	1.15
"Acrin" (dlvd.)	lb.	——	.65
"Advan"	lb.	.52	.55
"Altax"	lb.	.39	.41
"Arazate"	lb.	——	1.53
"Beutene"	lb.	.59	.61
"B-J-F"	lb.	.34	.36
"Butasan"	lb.	——	1.10
"Butazate"	lb.	——	1.10
"Butyl Eight"	lb.	.97	.99
"Captax"	lb.	.34	.36
"C-P-B"	lb.	——	1.95
"Cumate"	lb.	——	1.60
"Cuprax"	lb.	.60	.62
"Dibenzo G-M-F"	lb.	——	1.50
"Diesterex-N"	lb.	.50	.52
Diorthotolylguanidine (dlvd.)	lb.	.44	.46
Diphenylguanidine (dlvd.)	lb.	.35	.41
"El-Sixty"	lb.	.36	.43
"Ethasan"	lb.	——	1.10
"Ethazate"	lb.	——	1.10
"Ethyl Tuex"	lb.	——	1.25
Formaniline (dlvd.)	lb.	.36	.37
"G-M-F"	lb.	——	1.95
"Goodrite Erie"	lb.	.60	.62
"Guantal"	lb.	.39	.48
"Hepteen"	lb.	.34	.35
"Base"	lb.	1.25	1.30
"Ledate"	lb.	——	1.20
Mercaptobenzothiazole	lb.	.34	.36
Mercaptobenzothiazyl Disulfide	lb.	.39	.41
"Methasan"	lb.	——	1.20
"Methazate"	lb.	——	1.20
"Monex"	lb.	——	1.25
"Mono-Thiurad"	lb.	——	1.25
"Morfex 33"	lb.	.60	.62
"2-MT" (dlvd.)	lb.	.58	.60
"Namate"	lb.	——	1.00
"Novac"	lb.	——	1.40
"A-13"	lb.	.65	.67
"O-X-A-F"	lb.	.38	.40
"Pentex"	lb.	.74	.77
"Flour"	lb.	.12¼	.12¾
"Phenex" (tons)	lb.	——	.49
"Pipazate"	lb.	——	1.53
"Pip-Pip"	lb.	——	1.63
"R-2 Crystals"	lb.	——	1.55
"Rotax"	lb.	.44	.46
"Safex"	lb.	1.15	1.20
"Santocure"	lb.	.60	.67
"Selazate"	lb.	——	1.60
"Selenac" (Ethyl, Methyl)	lb.	——	1.60
"Setsit-5"	lb.	.75	1.00
"SPDX-G" (tons)	lb.	——	.53
"Tellurac, Ethyl"	lb.	——	1.60
"Tepidone" (dlvd.)	lb.	——	.63
"Tetrone" (dlvd.)	lb.	——	1.25
"A" (dlvd.)	lb.	——	1.85
Thiocarbanilide (dlvd.)	lb.	——	.28
"Thiofide"	lb.	.39	.46
"Thionex" (dlvd.)	lb.	——	1.25
"Thiotax"	lb.	.34	.41
"Thiurad"	lb.	——	1.25
"Thiuram E" (and "M") (dlvd.)	lb.	——	1.25
"Trimene"	lb.	.54	.56
"Base"	lb.	1.03	1.06
Triphenylguanidine (dlvd.)	lb.	——	.45
"Tuads" (Ethyl, Methyl)	lb.	——	1.25
"Tuex"	lb.	——	1.25
"Ultra" (tons)	lb.	——	.99
"L"	lb.	——	1.04
"Ureka"	lb.	.50	.57
"Blend B"	lb.	.50	.57
"C"	lb.	.48	.55
"Vulcanex" (dlvd.)	lb.	.42	.43
"Z-B-X"	lb.	——	2.45
"Zenite" (dlvd.)	lb.	.37	.39
"A" (dlvd.)	lb.	.42	.44
"B" (dlvd.)	lb.	.39	.41
"Zimate" ("Butyl," "Ethyl")	lb.	——	1.10
"Zimate, Methyl"	lb.	——	1.20

ACTIVATORS

Blue Lead, Sublimed (dlvd.)	lb.	.08½	.09
Fish Oil, Hydrogenated, Fatty Acid			
"Hyfac S-52"	lb.	.14¼	.15¾[a]
"Neo-Fat H.F.O." (dlvd.)	lb.	.14¾	.16¼
"Stearex Beads" (dlvd.)	lb.	.14¾	.15¾
Lime, Hydrated			
"Arrowhead"	ton	16.00	19.50
"Sierra"	ton	16.00	19.50
Litharge			
"Eagle" (dlvd.)	lb.	.09¾	.10¾
"FBS" (dlvd.)	lb.	.133	.15
Magnesium Oxide, Heavy			
"General Magnesite"	lb.	.06	.08
"Michigan No. 15"	lb.	.05	.05½
"Permanente"	lb.	.05	.06½
Magnesium Oxide, Light			
"Baker's" (Neoprene Grade)	lb.	——	.25
"General Magnesite" (Neoprene Grade)	lb.	——	.25
"General Magnesite" No. 101	lb.	——	.175
"General Magnesite" Standard	lb.	——	.22
"K & M"	lb.	——	.25
"Michigan No. 30"	lb.	——	.22½
"Michigan No. 40"	lb.	——	.25
"Witco Extra Light"	lb.	.25	.27
Oleic Acid (dlvd.)	lb.	.12½	.14¼
"Elaine O-18"	lb.	.12½	.13¾[a]
Palm Oil Fatty Acid (c.l.)	lb.	——	.11
Potassium Oleate (drums)	lb.	——	.29½
Red Lead			
"Eagle" (dlvd.)	lb.	.10¾	.11¾
"No. 2 RM" (dlvd.)	lb.	.148	.165
Sodium Laurate (drums)	lb.	——	.19
Sodium Oleate—Powder (drums)	lb.	——	.35
Paste (drums)	lb.	——	.20
Sodium Stearate—Powder (drums)	lb.	——	.35
USP Grade (drums)	lb.	——	.37
Stearic Acid, Single Pressed			
"S-24"	lb.	.15¾	.15¾[a]
"Stearex B" (dlvd.)	lb.	.15¾	.16¾

ACTIVATORS (Cont'd)

Stearic Acid, Double Pressed			
"Alba" (dlvd.)	lb.	.18½	.21½
"S-2-A" (dlvd.)	lb.	.15¾	.18¾
"S-2-B" (dlvd.)	lb.	.15¾	.16¾
Stearic Acid, Other			
"Hydrex" (c.l., dlvd.)	lb.	——	.14¾
"Neo-Fat 1-60" (dlvd.)	lb.	——	.15¾
"Neo-Fat 1-65" (dlvd.)	lb.	——	.18
"Stearite"	cwt.	14.87	15.87
White Lead Carbonate (dlvd.)	lb.	.09¾	.10¼
Zinc Laurate (c.l.)	lb.	——	.29
"Laurex"	lb.	.33	.36
Zinc Stearate	lb.	.29	.31
"Aquazinc"	lb.	.15	.16

Unclassified Activators

"Activex"	lb.	.20	.22
"Actoflux 1-S"	lb.	.52	.62
"3-S"	lb.	.58	.64
"Aero Ac 50"	lb.	.46	.52
"165"	lb.	.43	.45
"Barak" (dlvd.)	lb.	——	.50
"Bunac K-17"	lb.	.17	.19
"D-B-A"	lb.	——	1.95
"Delac J"	lb.	.50	.55
"P"	lb.	.39	.43
"Dibutylamine No. 117" (l.c.l., dms.)	lb.	——	.69
"Hydrofol Acid No. 51" (dlvd.)	lb.	.1487	.1587
"Palmalene" (drums)	lb.	——	.15
"Polyac" (dlvd.)	lb.	——	1.25
"Ridacto" (drums)	lb.	——	.20
"Snodotte" (dlvd.)	lb.	.1537	.1637
"SOAC" (min. 10 dms.)	cwt.	——	8.00
"Triamylamine No. 180" (l.c.l., drums)	lb.	——	1.01

ANTI-COAGULANTS

Anhydrous Ammonia (l.c.l.)	lb.	.02½	.02¾
"National" (cyl., dlvd.)	lb.	.13	.17
Aqua Ammonia (l.c.l., dms., dlvd.)	lb.	.02½	.02¾
"M.B.M." (l.c.l.)	lb.	——	.35

ANTI-FOAMING AGENTS

"Aero Anti Foam H"	lb.	——	.12
"Regular"	lb.	——	.08½

ANTI-OXIDANTS

"Agerite Alba"	lb.	1.95	2.05
"Gel"	lb.	.52	.54
"Hipar"	lb.	.61	.63
"HP"	lb.	.53	.55
"Powder"	lb.	.40	.42
"Resin"	lb.	.43	.45
"Resin D"	lb.	.40	.42
"Stalite"	lb.	.40	.42
"White"	lb.	1.23	1.33
"Akroflex C" (dlvd.)	lb.	.53	.55
"Albasan"	lb.	.69	.71
"Aminox"	lb.	.40	.42
"Antox" (dlvd.)	lb.	.54	.56
"Aranox"	lb.	——	1.95
Benzoquinone	lb.	1.50	1.75
"Betanox"	lb.	.43	.45
"B-L-E"	lb.	.40	.42
"Powder"	lb.	.61	.63
"B-X-A"	lb.	.43	.45
Carvacrol	lb.	——	.80
Chlorcarvacrol	lb.	——	2.00
"Flectol H"	lb.	.40	.47
"Flexamine"	lb.	.53	.55
Gallic Acid, Tech.	lb.	1.10	1.15
USP or NF	lb.	1.27	1.30
Hydroquinone	lb.	.90	.94
Monomethylparaminophenol sulfate	lb.	2.40	2.90
"Neozone Standard" (dlvd.)	lb.	.61	.63
"A" (dlvd.)	lb.	.40	.42
"C" (dlvd.)	lb.	.43	.45
"D" (dlvd.)	lb.	.40	.42
"D Distilled" (dlvd.)	lb.	.45	.47
"Oxynone"	lb.	.77	.90
"Parazone" (dlvd.)	lb.	——	.68
"Perflectol"	lb.	.53	.60
"Permalux" (dlvd.)	lb.	1.18	1.20
Pyrogallic Acid, Resublimed	lb.	2.60	2.65
USP Crystals	lb.	2.10	2.15
Resorcin, Tech. (dlvd.)	lb.	——	.64

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ANTI-OXIDANTS (Cont'd)

"Santoflex B"	lb.	.40	- .47
"8BX"	lb.	.54	- .61
"Santovar O"	lb.	1.15	- 1.40
"Santowhite"	lb.	1.23	- 1.38
"S.C.R." (tons)	lb.	——	- .32
"Solux" (dlvd.)	lb.	1.28	- 1.30
"Stabilite" (tons)	lb.	——	- .48
"Alba" (tons)	lb.	——	- .69
"L" (tons)	lb.	——	- .48
Tannic Acid, Tech.	lb.	.70	- .79
"Thermoflex" (dlvd.)	lb.	1.18	- 1.20
"A" (dlvd.)	lb.	.61	- .63
"C" (dlvd.)	lb.	.54	- .56
Thymol	lb.	——	- 2.50
"V-G-B"	lb.	.43	- .45

ANTI-SCORCHING AGENTS

"Retarder W" (dlvd.)	lb.	——	- .36
Salicylic Acid, Tech.	lb.	——	- .33
"Vultrol"	lb.	.50	- .55

ANTISEPTICS AND GERMICIDES

Formaldehyde (barrels)	lb.	——	- .057
"G-4"	lb.	.95	- 2.50
"G-11"	lb.	3.50	- 5.50
Methyl Para Hydroxy Benzoate	lb.	——	- 1.00
Ortho Cresol	lb.	.17½	- .18
"Soligen Drier"—Copper 8% (drums)	lb.	——	- .17
"Zinc 8%" (dms.)	lb.	——	- .15¾

AROMATICS (DEODORANTS)

"Arolene 1980" (c.l.)	lb.	——	- .10
"2286"	lb.	——	- .25
"2553" (c.l., dms.)	lb.	——	- .13
"Bouquet 149"	lb.	——	- 3.00
Coumarin	lb.	2.75	- 2.90
"Curodex 19"	lb.	——	- 4.75
"188"	lb.	——	- 5.75
"198"	lb.	——	- 6.75
"D-6 Masking Perfume"	lb.	——	- 1.35
"Deodorant 65"	lb.	——	- 1.00
"Deodorant L-37" (25 lbs.)	lb.	——	- 2.15
"L-44" (25 lbs.)	lb.	——	- 2.65
"Latex Perfume 5"	lb.	——	- 3.25
"6"	lb.	——	- 7.50
"9"	lb.	——	- .65
"Neutroleum Delta"	lb.	——	- 2.40
"Gamma"	lb.	——	- 3.40
"Paradors A"	lb.	2.00	- 2.50
"B"	lb.	.65	- 1.00
"C"	lb.	2.75	- 3.25
"D"	lb.	1.50	- 2.00
"E"	lb.	.25	- .55
"Rodo No. 0"	lb.	4.00	- 4.50
"No. 10"	lb.	5.00	- 5.50
"Rubber Perfume 7"	lb.	——	- 9.15
"12"	lb.	——	- 1.90
"Russian Leather 7"	lb.	——	- 4.10
Vanillin	lb.	2.35	- 2.40

BLOWING AGENTS

Ammonium Bicarbonate	lb.	.0564	- .0651
"Blowing Agent No. 15"	lb.	——	- .35
Sodium Bicarbonate, Tech. (c.l., bags)	cwt.	——	- 1.78½
"Sponge Paste"	lb.	——	- .20
"Unicel" (dlvd.)	lb.	——	- .50
Urea	ton	68.00	- 85.00

BONDING AGENTS

"Bonding Resin 4162"	lb.	——	- 1.50
"Durez 12987"	lb.	.48	- .53
"MDI-50"	lb.	——	- 2.50
"Reanite"	gal.	6.75	- 7.25
"Rex Compound 482"	gal.	——	- 1.05
"Ty-Ply Q" (and "S")	gal.	6.75	- 8.75

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	——	- 5.83
Glacial—99½% (bbls.)	cwt.	——	- 9.40
Calcium Nitrate, Tech, Crystals	lb.	.12½	- .15
Hydroxyacetic Acid—70% (dms.)	lb.	——	- .085
Zinc Nitrate, Tech.	lb.	.19½	- .22

COLORING AGENTS

Black

Carbon Black—See *Reinforcing Agents*			
"Lamphlack No. 10"	lb.	.06	- .09
"Mapico Black Iron Oxide" (50 lb. bags)	lb.	.081	- .0835

Blue

"Blue GD, Dispersed" (dlvd.)	lb.	——	- 3.95
"Paste" (dlvd.)	lb.	——	- 1.64
"Blue N" (dlvd.)	lb.	——	- .90
"Blue YD, Dispersed" (dlvd.)	lb.	——	- 1.90
"Monastral Fast Blue CP" (dlvd.)	lb.	——	- 3.50
"PCD, Dispersed" (dlvd.)	lb.	——	- 1.95
"Ramapo Blue"	lb.	3.08	- 3.13
Ultramarine	lb.	.12	- .30

Brown

Brown Iron Oxide	lb.	——	- .10
"Mapico Brown" (50 lb. bags)	lb.	——	- .1135

Green

Green Chromium Oxide, Pure	cwt.	26.00	- 27.50
Green Chromium Oxide, Pure, Hydrated	cwt.	70.00	- 85.00
"Green FD, Dispersed" (dlvd.)	lb.	——	- 1.35
"Monastral Fast Green GSD, Dispersed" (dlvd.)	lb.	——	- 2.85
"GSD Paste" (dlvd.)	lb.	——	- 1.10
"Permansa Green" (dlvd.)	lb.	——	- 1.78
"Pigment Green B"	lb.	1.35	- 1.40
"Ramapo Green"	lb.	3.60	- 3.65
"Utility Green"	lb.	——	- .28

Orange

"Molybdate Orange"	lb.	——	- .37
"Orange F" (dlvd.)	lb.	——	- 3.05
"FD, Dispersed" (dlvd.)	lb.	——	- 2.35
"OT" (dlvd.)	lb.	——	- 2.75

Purple

Purple Oxide	lb.	——	- .08

Red

Barium Lithol Red	lb.	.60	- .65
Cadmium Red	lb.	.95	- 1.25
Calcium Lithol Red	lb.	.60	- .65
"Graphic Red" (dlvd.)	lb.	——	- .65
Indian Red, Pure	cwt.	9.10	- 10.25
"Jozite"	lb.	.08¼	- .08¾
"Mapico Red 297" (50 lb. bags)	lb.	.0885	- .096
"Oximony" Iron Oxide	lb.	——	- .09
Red Iron Oxide, Light	cwt.	9.60	- 10.75
"Red PB" (dlvd.)	lb.	——	- 1.65
"PBD, Dispersed" (dlvd.)	lb.	——	- 1.50
"2B" (dlvd.)	lb.	——	- 1.65
"2BD, Dispersed" (dlvd.)	lb.	——	- 1.50
"Rubanox Red" CP-762 (dlvd.)	lb.	——	- 1.18
"Rubber Red CP-339" dlvd.)	lb.	——	- .97
"Solfast Red CP-663" (dlvd.)	lb.	——	- 1.68
"CP-787" (dlvd.)	lb.	——	- 1.18
"Watchung Red"	lb.	1.65	- 1.70

White—Lithopone

"Albalith"	lb.	.044	- .049
"Astrolith"	lb.	.0440	- .0465
"Cryptone No. 19"	lb.	.05¾	- .06¼
"CB No. 21"	lb.	.05¾	- .06¼
"Permalith"	lb.	.04¼	- .04½
"Ponolith"	lb.	.05¼	- .05⅝
"Sunolith"	lb.	.0440	- .0465
"Ti-Tone"	lb.	.07	- .07⅜

White—Titanium Pigments

"Raycal"	lb.	.05½	- .05¾
"Rayox"	lb.	.14½	- .16¼
"Ti-Bar"	lb.	.05¾	- .06
"Ti-Cal"	lb.	——	- .06
"Ti-Pure"	lb.	.16	- .17½
"Titanolith"	lb.	.05¾	- .06¼
"Titanox A"—all grades (dlvd.)	lb.	.14½	- .15¼
"B-30" (dlvd.)	lb.	.05¾	- .06
"C" (dlvd.)	lb.	.05½	- .05¾
"RA"—all grades (dlvd.)	lb.	.15½	- .16¼
"RC-HT" (dlvd.)	lb.	.05½	- .05¼
"Zopaque"	lb.	.14½	- .15

White—Zinc Oxide (American Process)

"AZO-ZZZ 11" (and "22, 33, 44, 55") (dlvd.)	lb.	.09½	- .09¾
"Eagle"	lb.	.09	- .09⅜
"Horse Head Special"	lb.	.09	- .09¼
"XX Red"	lb.	.09	- .09¼
"St. Joe Black Label" (dlvd.)	lb.	.09½	- .09¾
"Green Label" (dlvd.)	lb.	.09½	- .09¾
"Red Label" (dlvd.)	lb.	.09½	- .09¾

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	——	- .12

White—Zinc Oxide (French Process)

"AZO-ZZZ 66"	lb.	.11¾	- .12
"Florence Green Seal"	lb.	.10¾	- .11
"Red Seal"	lb.	.10¼	- .10½
"White Seal"	lb.	.11¼	- .11½
"Kadox 72"	lb.	.09	- .09¼
"Black Label"	lb.	.09	- .09¼
"Red Label"	lb.	.09	- .09¼
"U. S. P. 12"	lb.	.12	- .12½

White—Zinc Sulfide

"Cryptone ZS-800"	lb.	.09½	- .09¾

Yellow

Chrome Yellow	lb.	——	- .22½
"Chrome Yellow 12310"	lb.	——	- .18
"Ferrox"	cwt.	——	- 7.38
"Mapico Yellow" (50 lb. bags)	lb.	.0685	- .071
"Oximony" Iron Oxide	lb.	——	- .06¾
"Yellow G" (dlvd.)	lb.	——	- 1.75
"GD, Dispersed" (dlvd.)	lb.	——	- 1.50
"HN" (dlvd.)	lb.	——	- 1.37
Yellow Iron Oxide, Pure	cwt.	7.10	- 8.25

DISPERSING AGENTS

"Agchem SA-19"	lb.	——	- .30
"SA-20"	lb.	——	- .70
"Aquasol-AR 90%"	lb.	——	- .14½
"Darvan No. 1"	lb.	.15½	- .35
"No. 2"	lb.	.19	- .35
"Dilex"	lb.	——	- .32
"Dispersaid"	lb.	1.25	- 1.35
"Halloid"	lb.	.03¾	- .09½
"HornKem No. 1"	gal.	——	- 1.60
"No. 3G"	gal.	——	- 1.75
"No. 12"	lb.	——	- .17
"Marasperse CB"	lb.	.10	- .20
"Penetrol"	lb.	——	- .20
"Plastak"	lb.	.089	- .095
"Ramol PW"	lb.	.18	- .19
"Rubbex"	lb.	.139	- .14¾
"Stan-Chem BQC"	lb.	.12¾	- .17¾
"1067"	lb.	——	- .13½
"1471"	lb.	.1687	- .2187
"2251"	lb.	.12¾	- .17¾
Triethanolamine (drums dlvd.)	lb.	.19	- .20
"Triton R-100"	lb.	.15½	- .25
"Yelkin TT"	lb.	.26	- .35½
"Zinsper"	lb.	——	- .15

EXTENDERS

"Advagum 1098"	lb.	——	- .42
"Bunaweld Polymer No. 780"	lb.	——	- .22
"No. 5514"	lb.	——	- .30
"D-92" (and "D-93") (dms.)	lb.	——	- .12
"Extender 600"	lb.	——	- .13½
"HC-5"	lb.	.08½	- .12
"HC-22"	lb.	.12	- .15
"Multi-Plast MV 60 Emul."	gal.	.32	- .37
"Naftolen MV 60 Emul."	gal.	.60	- .65
"HV 60 Emul"	gal.	.75	- .80
"PR-162 Latex" (dms.)	gal.	1.00	- 1.60
"Synprolac"	lb.	——	- .19
"Synprowax"	lb.	.16	- .19

FILLERS (Inert and Reinforcing)

Abrasives			
"Carbonite"	lb.	.13	- .95
"Lionite"	lb.	.09¾	- .90
Aluminum Hydrate	lb.	——	- .14½
Aluminum Silicate			
"Silical"	ton	37.00	- 55.00
Barium Carbonate (l.c.l.)	ton	77.00	- 85.00
Barytes			
No. 1 Floated, White	ton	30.10	- 40.95
No. 2 Floated, Unbleached	ton	28.10	- 38.95
"No. 22 Barytes" (c.l.)	ton	——	- 18.37
"Foam A"	ton	——	- 30.10
Off-Color, Domestic (l.c.l.)	ton	29.00	- 32.00
Bentonite (c.l.)	ton	——	- 10.25
Blanc Fixe	ton	60.00	-120.00
Calcium Carbonate			
"Atomite" (c.l.)	ton	——	- 27.50
"B.I. White No. 1" (c.l.)	ton	——	- 7.00
"Calcene T"	ton	40.00	- 50.00
"Camelwhite" (c.l.)	ton	27.50	- 30.00
"Kalite"	ton	26.00	- 52.00
"Kalvan"	ton	100.00	-126.00
"Lesamite" (c.l.)	ton	——	- 27.50
"Lim-Cal" (c.l.)	ton	——	- 12.50
"Millical" (bags)	ton	18.00	- 30.00
"Suprex White"	ton	——	- 32.50
"Suspenso" (bags)	ton	17.00	- 29.00
"Swansdown" (bags)	ton	15.00	- 27.00
"Witcarb R" (c.l.)	ton	——	-100.00
"Witcarb R12" (c.l.)	ton	——	- 32.50
Calcium Silicate			
"Silene EF"	ton	110.00	-120.00
Calcium Sulfate, Anhydrous			
"Snow White Filler"	ton	——	- 16.00
Calcium Sulfate, Hydrous			
"Crysta-Cal" (c.l.)	ton	——	- 12.50
"Terra Alba No. 1"	ton	12.00	- 14.40
Chalk Whiting (l.c.l.)	lb.	.0150	- .0175
"Recco Paris Whiting"	ton	——	- 25.00
Clay			
"Alsite" (c.l.)	ton	——	- 11.00
"Aluminum Flake"	ton	15.00	- 30.00
"A.S.P. No. 1" (c.l.)	ton	——	- 30.00
"No. 11" (c.l.)	ton	——	- 40.00
"Buca" (c.l.)	ton	——	- 44.00
"Catalpo" (c.l.)	ton	——	- 33.00
"Champion"	ton	——	- 12.00
"C.S.D." (c.l.)	ton	——	- 10.00
"Crown"	ton	——	- 12.00
"Dixie"	ton	12.00	- 24.50
"Hydratex R"	ton	22.00	- 34.50
"Kaolloid Clay" (c.l.)	ton	——	- 10.00
"Markham"	ton	——	- 12.00
"McNamee"	ton	11.00	- 23.50
"Oldham"	ton	——	- 12.00
"Paragon"	ton	11.00	- 23.50
"Penna Clay" (c.l.)	ton	——	- 12.00
"Pigment 33" (c.l.)	ton	——	- 35.00
"Recco Clay" (c.l.)	ton	——	- 11.00
"Suprex"	ton	12.00	- 24.50
"Upton"	ton	19.50	- 21.00
"Whitetex" (c.l.)	ton	——	- 50.00
"Witco No. 1" (c.l.)	ton	——	- 12.00
"No. 2" (c.l.)	ton	——	- 12.00
Diatomaceous Earth	ton	30.00	- 50.00
"Kaylorite" (c.l.)	ton	——	- 30.00
Dolomite (c.l.)	ton	——	- 12.50

New Stock Cooling Rack

THIS New Rack offers a convenient method for storing materials that require cooling or air drying.

- Rack can be either stationary or mounted on casters.
- Trays have perforated metal surface and can be spaced to suit.
- Standard Rack has eighteen trays 36" x 36" spaced 2⅝" apart.

SPADONE MACHINE COMPANY

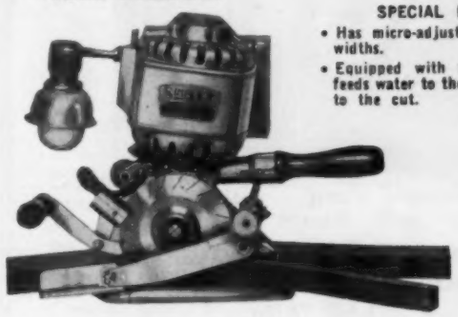
10 East 43rd St. New York 17, N. Y.

SIMPLEX
REG. TRADE MARK

RUBBER STRIP CUTTER

PATENTED

A PORTABLE machine capable of stripping slab rubber up to 1" thick at the rate of 20,000 feet in 8 hours. Any width desired.



SPECIAL FEATURES

- Has micro-adjustment for accurate widths.
- Equipped with water tank which feeds water to the slotted knife and to the cut.
- Has repulsion-induction motor which carries any overloads.
- Automatic sharpener device keeps knife keen and sharp.
- Has base with rollers and is very easy to handle.

Cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber. Cuts a slab down to the last shaving. Cuts all grades of rubber including pure gum, sponge, etc. Cuts squarely—no rejects.

Now in use by many leading Rubber Manufacturers & Jobbers

Simplex Cloth Cutting Machine Co., Inc.

Manufacturers of a Complete Line of Cloth Cutting Machinery

270 West 39th St. New York 18, N. Y.

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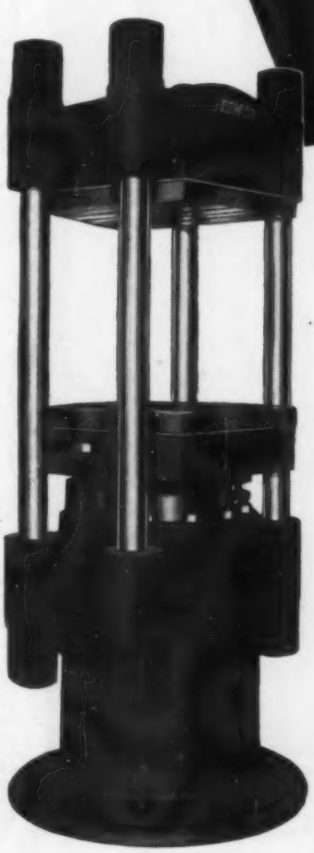
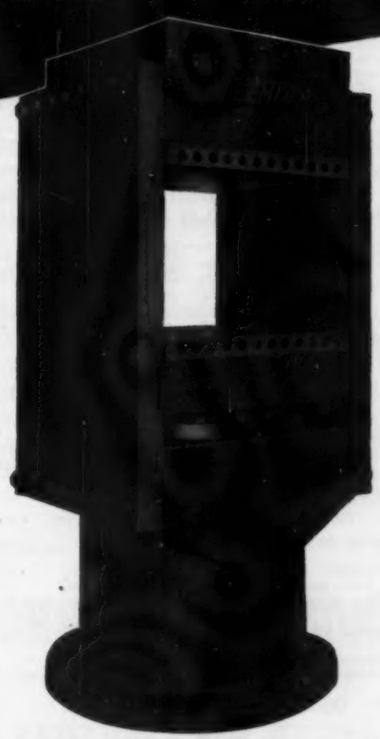
PRESSES

FOR RUBBER & PLASTICS PROCESSING





Manufactured in all sizes, EEMCO hydraulic presses are furnished with or without self-contained pumping units or special features. Built for heavy duty and especially designed to save you money on maintenance and operating costs. It will pay you to consult with EEMCO engineers on all rubber and plastics processing machinery needs.

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38 South Dearborn Street
CHICAGO 3, ILL.

OHIO
DUGAN & CAMPBELL
907 Akron Savings & Loan Bldg.
AKRON, OHIO

EASTERN
H. E. STONE SUPPLY CO.
OAKLYN, N. J.

MILLS	EXTRUDERS	STRAINERS
PRESSES	WASHERS	CRACKERS
TUBERS	CALENDERS	REFINERS

EEMCO ERIE ENGINE & MFG. CO.

953 EAST 12th ST., ERIE, PENNA.

FILLERS (Cont'd)

Flock			
Cotton	lb.	.08½ -	.20
"Filfloc F 40-9000"	lb.	— -	.10½
"Filfloc F 6000"	lb.	— -	.16
Rayon, bleached or dyed	lb.	.85 -	1.50
Rayon, grey	lb.	.10 -	.12
"Solka-Floc" (l.c.l.)	lb.	.06 -	.12
Wool, bleached or dyed	lb.	.70 -	1.00
Glue, Bone (dlvd.)	lb.	.16½ -	.18½
Ground Glass (l.c.l.)	lb.	.04 -	.06
Leather, Shredded	lb.	.05 -	.17
Lignin	lb.	.03 -	.06
"Indulin"	lb.	— -	.09
Limestone, Pulverized	ton	3.25 -	10.00
"Micro Velva"	ton	30.00 -	32.00
"Velvet Filler, Regular"	ton	16.00 -	18.00
Magnesium Carbonate	lb.	.06¼ -	.08½
"Clearcarb"	lb.	.09 -	.09½
"K & M"	lb.	.06¼ -	.07¼
Magnesium Silicate	ton	18.00 -	35.00
"Airex"	ton	22.50 -	23.50
"Asbestol"	ton	17.00 -	25.00
"L.S. Silver"	ton	22.50 -	23.50
"Sierra White"	ton	19.50 -	21.00
Mica	lb.	.03 -	.07
"Concord"	lb.	.05¾ -	.06¼
"Micro-Mica"	lb.	.06½ -	.07
"Mineralite" (c.l.)	ton	30.00 -	40.00
"Silversheen"	lb.	.05¾ -	.06¼
"Triple A Mica" (c.l.)	ton	— -	25.00
"Wet Ground Mica No. 160"	lb.	.05¼ -	.06¼
Pumice	lb.	.03 -	.05
Pyrophyllite			
"Pyrax"	ton	10.50 -	25.00
Silica	ton	16.00 -	27.00
Slate, Powdered (l.c.l.)	ton	15.00 -	20.00
Talc, Domestic	ton	9.00 -	20.00
Whiting, Commercial	ton	8.00 -	20.00
"Cameline" (c.l.)	ton	8.50 -	10.00
"C-C-O White"	ton	— -	14.50
"Keystone" (c.l.)	ton	— -	14.00
"Snowflake" (c.l.)	ton	— -	16.00
"Veroc" (c.l.)	ton	— -	7.50
"York White" (c.l.)	ton	— -	8.00
Wood Flour	ton	20.00 -	62.18

FINISHING MATERIALS, SURFACE

Shellac, Orange Gum	lb.	.70 -	.95
"VanWax"	gal.	1.25 -	1.30

FLAME RETARDANTS

Chlorinated Paraffin	lb.	.10 -	.25
"Zinc Borate 3167"	lb.	.12 -	.16¾
"Zyrox"	lb.	.35 -	.45

LUBRICANTS, MOLD

"Aquadag"	lb.	3.15 -	3.45
"Aquarex L Paste" (dlvd.)	lb.	— -	.85
"MDL Paste" (dlvd.)	lb.	— -	.25
Borax, Granular (l.c.l.)	ton	56.00 -	61.00
"Colite Concentrate" (dms.)	gal.	— -	.90
"Concentrex"	lb.	— -	.20
"Dipex"	lb.	.11 -	.13
"M"	lb.	.13 -	.15
"Dri-Lube"	lb.	— -	.18
"Glycerized Lubriaant"	gal.	— -	1.50
"Glydag"	lb.	1.30 -	2.00
"G.T.M.C. Solution"	lb.	1.05 -	1.35
"Kokobace"	lb.	— -	.12
"Latex-Lube"	lb.	.22¾ -	.24¾
"Liqui-Lube"	lb.	.17¼ -	.18¼
"Lubrex"	lb.	.25 -	.30
"Migralube"	lb.	— -	.30
"Moldex"	lb.	— -	.12½
"Moldeze No. 1"	gal.	— -	36.00
"No. 2"	gal.	— -	12.00
"No. 3"	gal.	— -	12.00
"Mold-Slick"	lb.	.202 -	.215
"Orvus WA Paste" (dms.)	lb.	— -	.25
"Prodag"	lb.	.25 -	.38
"Redotex Flakes" (dlvd.)	lb.	.14⅛ -	.14¾
"Powder" (dlvd.)	lb.	.14½ -	.15⅛
"Rubber-Flo"	gal.	— -	1.00
"Rubber-Glo"	gal.	— -	.94
"Rusco Mold Paste"	lb.	.12 -	.18
"Sericite" (l.c.l.)	ton	65.00 -	75.00
"Ulco Mold Soap"	lb.	.10 -	.18
"Werkrite Flakes" (dlvd.)	lb.	.12 -	.12⅝
"Powder" (dlvd.)	lb.	.12⅜ -	.13

LUBRICANTS, RUBBER

Lithium Stearate	lb.	— -	.50
Propylene Stearate (drums)	lb.	— -	.40
"Rubberol"	lb.	— -	.18½

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.30 -	.31
Calcium Stearate	lb.	.25 -	.27
"Orel"	gal.	1.85 -	2.00
Polyethylene Glycol	lb.	.25 -	.26
"Rexanol A"	lb.	— -	.11
"Separex A"	lb.	— -	.15

MOLD CLEANERS

"Actusol"	gal.	1.65 -	1.85
"Metso 99"	cwt.	3.05 -	4.45
"Granular"	cwt.	2.50 -	3.55
"Rubber-Sol"	gal.	— -	1.89
Sodium Silicate	cwt.	.80 -	1.40
"Sprex A.C."	lb.	— -	.15

PEPTIZING AGENTS

Carbothermic Magnesia	lb.	— -	.13½
"Peptizer P-12"	lb.	.75 -	.83

PLASTICIZERS & SOFTENERS

"AA" (drums)	lb.	— -	.13¾
"Acto 500"	lb.	— -	.09
"Adipol BCA" (dms.)	lb.	— -	.40
"Amalgamator Z-4"	lb.	— -	.30
"American" Pine Tar	gal.	.25 -	.38½
"Bardex"	lb.	.05 -	.05¼
"Bardol"	lb.	.02¼ -	.02¾
"B" (l.c.l.)	lb.	.05 -	.05¼
"Bayol D"	gal.	.25 -	.26
"F"	gal.	.37 -	.40
Beeswax, Refined & Bleached	lb.	.60½ -	.70
Yellow Refined	lb.	.54 -	.62
"Bondogen"	lb.	.55 -	.85
"B.R.C. No. 20"	lb.	.0105 -	.0115
"B.R.H. 2"	lb.	.0225 -	.0235
"B.R.S. 700"	lb.	.012 -	.018
"B.R.T. 3"	lb.	.019 -	.02
"4"	lb.	.02 -	.021
"7"	lb.	.0215 -	.0225
"B.R.V."	lb.	.03 -	.0375
"Bunarex"	lb.	.05½ -	.06½
"Bunatak M"	lb.	— -	.20
"O"	lb.	— -	.18
"R"	lb.	— -	.14
"U"	lb.	— -	.15
"No. 21"	lb.	— -	.08
"No. 90"	lb.	— -	.08
"No. 865"	lb.	— -	.17
"No. 1080"	lb.	— -	.09½
Burgundy Pitch	lb.	— -	.10
"Butac"	lb.	.1101 -	.1476
Butyl Benzyl Sebacate	lb.	.75 -	.77½
Butyl Palmitate	lb.	— -	.26½
Butyl Roleate	lb.	.16 -	.18
"BWH-1"	lb.	— -	.10
"Campol" (t.c.)	ton	— -	42.00
Candelilla Wax, Prime	lb.	.78 -	.85
"Carbonex"	lb.	.03 -	.03½
"S"	lb.	.03¼ -	.03¾
"S Plastic"	lb.	.031 -	.0335
"Carbowax 4000" (drums)	lb.	.29 -	.30
"Cardolite 615"	lb.	.32 -	.35
"816"	lb.	.20 -	.23
"5858"	lb.	.42 -	.46
Carnauba Wax, Crude	lb.	1.30 -	1.77
Refined	lb.	1.85 -	1.90
Substitute	lb.	.45 -	1.08
Yellow	lb.	2.00 -	2.05
"Celluflex 142" (and "179"), (drums)	lb.	— -	.31½
Ceresin Wax	lb.	.15 -	.25
"Contogum"	lb.	.06¾ -	.10¾
"Cumar Resins"	lb.	.05¼ -	.11¾
"Darex Copolymer X11"	lb.	.40 -	.50
"X54"	lb.	.42 -	.60
"D.B.M."	lb.	— -	.30
Degras, Common	lb.	.10 -	.14
Diamylphenol (l.c.l., drums)	lb.	— -	.21
Dibenzyl Ether (drums)	lb.	— -	.40
Dibenzyl Sebacate	lb.	.66 -	.70½
Dibutyl Phthalate	lb.	.20 -	.20½
Dibutyl Sebacate—Tech.	lb.	.49 -	.51½
C.P.	lb.	.51 -	.53½
Dicapryl Phthalate	lb.	.24½ -	.27
Di-carbitol Phthalate (l.c.l., drums)	lb.	— -	.35
"Dielex"	lb.	.05½ -	.06
Diethyl Phthalate (t.c.)	lb.	— -	.20½
Dihexyl Sebacate	lb.	.47 -	.49½
Dimethyl Phthalate	lb.	.19 -	.20½
Dimethyl Sebacate	lb.	.65 -	.67½
"Dinopol" (dms., dlvd.)	lb.	.35½ -	.36
Dioctyl Phthalate (drums, dlvd.)	lb.	.35½ -	.36
Dioctyl Sebacate	lb.	.53 -	.55½
"Dipolymer Oil"	gal.	.33 -	.38
"Dispersing Oil No. 10"	lb.	.04½ -	.04¾
"Dutrex A" ("B," "5," "6")	lb.	.02½ -	.03¾
"15"	gal.	.10 -	.189
"20," "21," "25"	lb.	— -	.03
"Dyal 89"	lb.	— -	.45
"Econo-Plast" (drums)	lb.	.03¼ -	.03¾
"ELA" (dlvd.)	lb.	— -	.80
"Estac"	lb.	— -	.14½
"Ethox" (l.c.l., drums)	lb.	— -	.3065
"Flexol DOP" (dlvd.)	lb.	.34½ -	.36
"Flexol 3GH" (dms., dlvd.)	lb.	.55 -	.56
"3GO" (dlvd.)	lb.	.51½ -	.53½
"4GO" (dlvd.)	lb.	.38 -	.40
"H-70"	lb.	.56¾ -	.64½
"Hercolyn" (dlvd.)	lb.	.12 -	.16
"Herco-H.T."	gal.	.17 -	.22
"Herco-Plas"	lb.	— -	.03
"Herco-Wax"	lb.	— -	.03½
"HT-300"	lb.	.45¾ -	.53
"Indonex 633½" ("634½, 638½, 639½")	gal.	.14 -	.16
"Indopol H-300"	gal.	1.27 -	1.31
"JMH"	lb.	— -	.65
"Kapsol" (l.c.l., drums)	lb.	— -	.29
"KP 23" (dms.)	lb.	— -	.29
"120" (dms.)	lb.	— -	.39
"140" (dms.)	lb.	— -	.45
"150" (dms.)	lb.	— -	.29
"201" (dms.)	lb.	— -	.42
"Kronisol" (drums)	lb.	.297 -	.3065
"Kronitex" (drums)	lb.	.25½ -	.26½
Lanolin, Tech., Anhydrous	lb.	.20 -	.26
Lead Oleate	lb.	.16½ -	.19¾
"Lindol" (drums)	lb.	— -	.25½
2-Mercaptoethanol (drums)	lb.	— -	.75

PLASTICIZERS & SOFTENERS (Cont'd)

"Methox" (l.c.l., drums)	lb.	— -	.3065
Methyl Oleate	lb.	— -	.20
Methyl Stearate	lb.	— -	.34
"Montan Substitute No. 506"	lb.	.425 -	.435
"Monten Wax" (c.l.)	lb.	— -	.12
"Monty Wax"	lb.	— -	.33
"Multi-Plast" (drums)	lb.	.04¼ -	.04¾
"Naftolen HV" (and "R-100") (drums)	lb.	.11 -	.12
"LV" and "MV" (drums)	lb.	.05¼ -	.05¾
"Nerium"	lb.	— -	.09
"Nevillac Resins" (drums)	lb.	.17 -	.50
"Neville Resins" (drums)	lb.	.08½ -	.14¾
"Nevindene Resins" (drums)	lb.	.10½ -	.13½
"Nevinol" (drums)	lb.	— -	.13
"Nevoll"	lb.	.02 -	.02½
"Nevtex 10" (drums)	lb.	— -	.08
"90" (drums)	lb.	— -	.20
"Nuba 1" (and "2") (drums)	lb.	— -	.029
"3X" (drums)	lb.	— -	.04¾
"15 (and 30) Oil" (drums)	lb.	— -	.17¾
"781 Oil" (drums)	lb.	— -	.22
"No. 480 Oil Proof Resin"	lb.	.14 -	.14½
"Opalwax"	lb.	.22 -	.23
Ortho-Nitrobiphenyl	lb.	.06 -	.11
"Ozokerite Wax No. 64 White"	lb.	.31 -	.32
"Yellow"	lb.	.25 -	.26
"P-1" (and "4, 6, 8, 20") (drums)	lb.	.26½ -	.33
"P-75"	lb.	.66 -	.72
"Pale 4" (and "1000") (drums)	lb.	— -	.17¾
Palm Oil	lb.	— -	.11
"Paradene Resins" (drums)	lb.	.05¼ -	.06¼
"Para Flux" (drums)	gal.	— -	.19
"2016" (l.c.l.)	gal.	— -	.20
"Para Lube" (l.c.l.)	lb.	— -	.048
"Paraplex G-25"	lb.	.69 -	.70
"G-40"	lb.	.47 -	.48
"Parmo"	lb.	.04½ -	.12½
"Paroil 143"	lb.	— -	.09¾
"170, Powdered"	lb.	— -	.18
"Pentalene 90" (l.c.l., dms.)	lb.	— -	.17
"92" (l.c.l., drums)	lb.	— -	.25
"Pentaphen No. 114" (l.c.l., bags)	lb.	— -	.23
"Pepton 22"	lb.	.70 -	.75
"PG-16" (drums)	lb.	— -	.34
"Picco 10" (and "25")	lb.	— -	.11
"75" (and "100")	lb.	— -	.10½
"S.O.S."	gal.	.29 -	.34
"Piccocizer 30"	lb.	.05½ -	.06
"D"	lb.	— -	.10
"Piccolastic A" (and "B, C, D, E")	lb.	.20 -	.20½
"F"	lb.	.12½ -	.13
"Piccolyte S Resins"	lb.	.19 -	.22½
"Piccoumaron Resins"	lb.	.06¼ -	.10¾
"Piccovar"	lb.	.08 -	.11½
"Piccovol"	lb.	.02 -	.02¾
"Pictar"	gal.	.18 -	.23
"Plas-Blend 360"	lb.	.02½ -	.03
"Plastac M"	lb.	.08¾ -	.09¼
"Plasticizer 3"	lb.	.12 -	.14
"Plasticizer No. 7-2"	lb.	— -	.60
"No. 11-2"	lb.	— -	.32
"Plasticizer No. 1889"	lb.	— -	.565
"No. 1919"	lb.	— -	.52
"No. 2069" (l.c.l.)	gal.	— -	.23
"No. 2070" (l.c.l.)	gal.	— -	.27
"Plasticizer ODN" (Tech.)	lb.	.175 -	.227
Purified	lb.	.235 -	.287
"Plasticizer SC"	lb.	— -	.50
"Plasticizer VA-1"	lb.	.33 -	.35
"Plastoflex 50"	lb.	.28 -	.29
"Plastogen"	lb.	.07¾ -	.12
"Plastolein X-55" (dms.)	lb.	— -	.42
"X-148" (dms.)	lb.	— -	.45
"Plastone"	lb.	.27 -	.30
"Polymel Liquid"	gal.	.12 -	.17
"Polymel Resins"	lb.	.02½ -	.05½
"PT 101" ("400, 600, 800") (c.l., drums)	gal.	— -	.31
"Refrigerator Oil 145-R"	gal.	— -	1.25
"Reogen"	lb.	.11½ -	.15
"465 Resin" (drums)	lb.	— -	.03½
"Resin 731"	lb.	— -	.10½
"Resin C"	lb.	.015 -	.021
"Resinex"	lb.	.02½ -	.03
"Ridbo 369" (drums)	lb.	.08 -	.09
"369-F" (drums)	lb.	— -	.12
"Rosin Oil"	gal.	.45 -	.70
"R.P.A. No. 2" (dlvd.)	lb.	— -	.65
"No. 4" (dlvd.)	lb.	— -	.80
"No. 5" (dlvd.)	lb.	— -	.57
"R.S.N. Flux"	gal.	.10 -	.19
"R.S.O. Softening Oil"	lb.	.02½ -	.03
"Rubtar"	gal.	— -	.40
"Santicizer B-16"	lb.	.32 -	.36
"E-15"	lb.	.34 -	.38
"M-17"	lb.	.35½ -	.39
"No. 140"	lb.	.25 -	.35½
"Softener No. 20"	gal.	.09 -	.25
"S.P.C."	lb.	— -	.19½
"S.R.O."	lb.	.02 -	.02¾
"Stanolind Petrolatum"	lb.	.032 -	.069
"Wax"	lb.	.25 -	.30
"Staybelite Resin" (dms.)	lb.	— -	.09
"Sunny South" Pine Tar	gal.	.25 -	.38½
"Superla Wax"	lb.	.23 -	.28
"Syncera Wax"	lb.	.16 -	.21
"Synplasticizer"	lb.	— -	.10
"Syn Tac" (c.l.)	gal.	— -	.33

DIC

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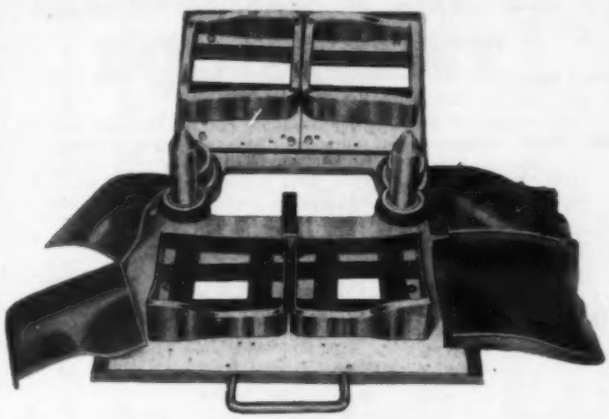

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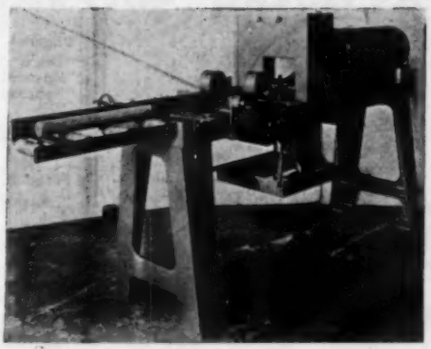

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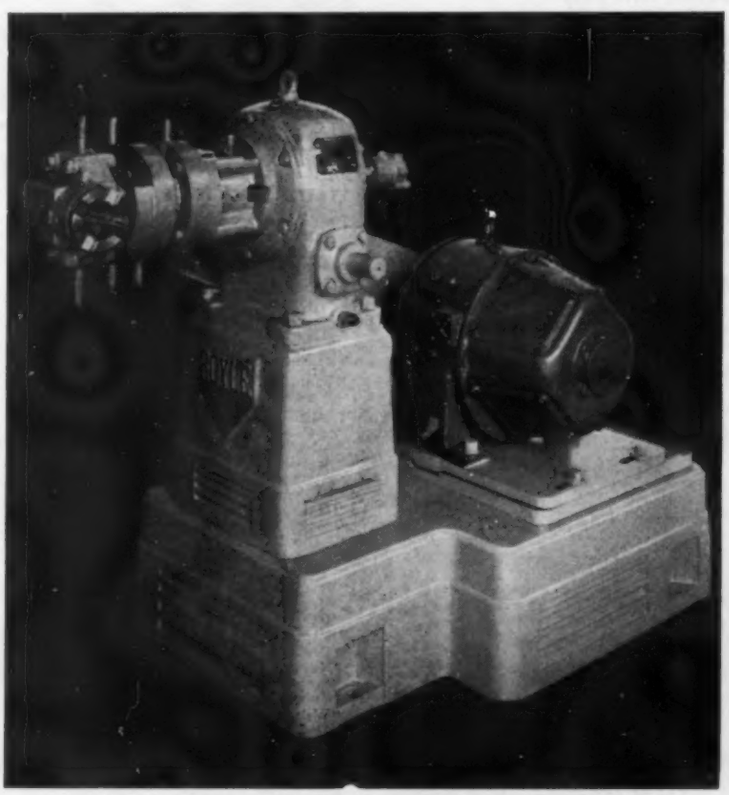

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PLASTICIZERS & SOFTENERS (Cont'd)

"Synthol"	lb.	——	-	.22½
Tar, Refined	gal.	.10	-	.15
"K-Tarnel NR" (t.c.)	lb.	——	-	.0851
"Terpene A"	gal.	——	-	.65
"Thiokol TP-90 B" (and "TP-95")	lb.	.55	-	.65
Triacetin	lb.	.34	-	.45
Tricresyl Phosphate	lb.	.24	-	.25½
Triphenyl Phosphate	lb.	.26	-	.27
"Turgum S"	lb.	.0926	-	.1126
"Vanadiset A" (to "F")	lb.	.0165	-	.05
"Pulverized"	lb.	.08½	-	.21
"Solution"	gal.	.40	-	.65
"Vistac No. 1"	gal.	——	-	1.31
"No. 2"	gal.	——	-	1.65
"No. 4"	gal.	——	-	1.79
"Wilcor-Plast"	lb.	.02½	-	.02⅝
"Witresin"				
Granular	ton	50.00	-	60.00
Solid	ton	40.00	-	50.00

PROCESSING AIDS

Castor Oil, Processed (dms.)	lb.	——	-	.17¼
Refined (drums)	lb.	——	-	.15¾
"Castorwax" (min. 400 lbs.)	lb.	——	-	.25
"Dutrex 7"	lb.	.02½	-	.03⅜
"30"	gal.	.24	-	.27
"Resin No. 510"	lb.	——	-	.16
"Wilmac D-X"	lb.	.09	-	.10

PROTECTIVE & STABILIZING AGENTS

"Agchem SA-9" (to "SA-12")	lb.	.65	-	1.02
"Alpha Protein"	lb.	.28	-	.32
"Aroostoocrat"	lb.	——	-	.07½
Acacia	lb.	.12¾	-	.21
Carob Bean Flour	lb.	.45	-	.60
Casein	lb.	.24	-	.24¾
Ethylene Diamine 68%	lb.	.57	-	.58
Karaya Gum	lb.	.19	-	.45
"Proscin"	lb.	.071	-	.09
"Rex Compound No. 2801"	lb.	——	-	.15
Sodium Alginate	lb.	——	-	1.50
"Stablex B"	lb.	——	-	.95
Starch, Corn, Processed	lb.	——	-	.0795
Tragacanth Flakes	lb.	.30	-	1.00

RECLAIMING AGENTS

"1-D Heavy Oil" (drums)	lb.	——	-	.04
"No. 517 H.B. Oil"	gal.	.11½	-	.16½
"535"	gal.	.22	-	.27
"No. 523 H.S. Oil"	gal.	.22	-	.27
"C-6 Oil" (and "28," "32")	gal.	.33	-	.38
"C-10 Oil"	gal.	.21	-	.25
"C-33 Oil"	gal.	.19	-	.24
Caustic Soda—Flake 76% (c.l., drums)	cwt.	——	-	3.09¾
Liquid 50% (t.c.)	cwt.	——	-	2.04¾
Solid 76% (c.l., drums)	cwt.	——	-	2.41½
Cresylic Acid	gal.	.75	-	.83
"D-4"	gal.	.19	-	.24
"E-5"	gal.	.17	-	.22
"LX-83 Reclaiming Solvent"	gal.	.13	-	.23
"LX-572 Reclaiming Oil"	gal.	.20	-	.28
"Reclaiming Oil 1621"	6gal.	.02	-	.02¼
"Reclaiming Reagent No. 3"	lb.	.12	-	.15
"R.P.A. No. 3" (dlvd.)	lb.	——	-	.46
Soda Ash (c.l., bags)	cwt.	——	-	1.10¼
"Solvent 534"	gal.	.22	-	.27
"Solvent Oil 21"	gal.	——	-	.24
"Wilcor Reclaiming Oil No. 111" (drums)	gal.	.26	-	.30
"No. 151" (drums)	gal.	.26	-	.30
"X-1 Resinous Oil"	lb.	.011	-	.016
"X-60 Solvent"	gal.	.20	-	.28

REINFORCING AGENTS—CARBON BLACK

Note: New carbon black prices have been announced by some companies for 1947. Those which have been received up to Dec. 16, 1946, are included below.

Channel, Hard Processing (HPC) (bags)

"Atlantic HPC-98"	lb.	.05¾	-	.102
"Continental F"	lb.	.064	-	.1025
"Croflex"	lb.	.05¾	-	.102
"Crow"	lb.	.05¾	-	.102
"Dixiedensed" (and "S," "66")	lb.	.05¾	-	.102
"Kosmobile" (and "S," "66")	lb.	.05¾	-	.102
"Kosmos T"	lb.	.05¾	-	.102
"Micronex HPC"	lb.	.064	-	.1025
"Spheron 4"	lb.	.0632	-	.102
"Witco Disperso No. 6"	lb.	.064	-	.1025

Channel, Medium Processing (MPC) (bags)

"Atlantic MPC-95"	lb.	.05¾	-	.102
"Colloidal Micronex" (dms.)	lb.	.07¼	-	.08¼
"Continental A"	lb.	.064	-	.1050
"Croflex TH"	lb.	.05¾	-	.102
"Dixie R-1"	lb.	.05¾	-	.102
"Dixiedensed HM" (and "S-66")	lb.	.05¾	-	.102
"Huber TX"	lb.	.064	-	.1050
"Kosmobile HM" (and "S-66, SMG")	lb.	.05¾	-	.102
"Kosmos M"	lb.	.05¾	-	.102
"Micronex Standard"	lb.	.064	-	.1025
"Spheron 6"	lb.	.0632	-	.102
"Witco Disperso No. 1"	lb.	.064	-	.1025

Channel, Easy Processing (EPC) (bags)

"Atlantic EPC E-42"	lb.	.05¾	-	.102
"Collocarb"	lb.	——	-	.065
"Continental AA"	lb.	.064	-	.1025
"Croflex 77"	lb.	.05¾	-	.102
"Dixiedensed 77"	lb.	.05¾	-	.102
"Kosmobile 77"	lb.	.05¾	-	.102
"Micronex W-6"	lb.	.064	-	.1025
"Spheron 9"	lb.	.0632	-	.102
"Witco Disperso No. 12"	lb.	.064	-	.1025
"Wyex"	lb.	.064	-	.1050

Channel, Conductive (CC) (bags)

"Dixie 5"	lb.	.05825	-	.107
"Kosmink"	lb.	.05825	-	.107
"Spheron C"	lb.	.08	-	.12½
"I"	lb.	.066	-	.111
"N"	lb.	.18½	-	.25
"Voltex"	lb.	.15	-	.18½

Furnace, High Elongation (HEF) (bags)

"Sterling K"	lb.	.05	-	.09

Furnace, High Modulus (HMF) (bags)

"Continex HMF"	lb.	.05	-	.09
"Croflex 40"	lb.	.05	-	.07½
"Dixie 40"	lb.	.05	-	.07½
"Kosmos 40"	lb.	.05	-	.07½
"Modulex"	lb.	.05	-	.09
"Philblack A"	lb.	.05	-	.06
"Statex 93"	lb.	.05	-	.09
"Sterling L"	lb.	.05	-	.09

Furnace, Semi-Reinforcing (SRF) (bags)

"Colloidal Black Dispersion 33" (drums)	lb.	.12¾	-	.13¾
"Continex SRF"	lb.	.03½	-	.07½
"Croflex 20"	lb.	.03½	-	.05½
"Dixie 20"	lb.	.03½	-	.05½
"Essex"	lb.	.03½	-	.07½
"Furnex"	lb.	.03½	-	.07½
"Gastex"	lb.	.03½	-	.06
"Kosmos 20"	lb.	.03½	-	.05½
"Pelletex"	lb.	.03½	-	.06
"Seminex"	lb.	.03½	-	.05¼
"Sterling R"	lb.	.03½	-	.07½
"Sterling S"	lb.	.03½	-	.07½

Furnace, Fine (FF) (bags)

"Statex B"	lb.	.05¼	-	.08½

Thermal, Fine (FT) (bags)

"P-33"	lb.	.04½	-	.07

Thermal, Medium (MT) (bags)

"Thermax"	lb.	.02¾	-	.05½

REINFORCING AGENTS—MISCELLANEOUS

"Darax Copolymer No. 2" (and "No. 3")	lb.	——	-	.46
"Durez 12687" (and "12707")	lb.	.27½	-	.29
"Marbon B" (and "S, S-1")	lb.	.52	-	.65
"Marmix"	gal.	1.35	-	1.75
"Naftex SRF"	lb.	.04¾	-	.06½
"HMF"	lb.	.05¾	-	.07¾
"EPC"	lb.	.07	-	.09½
"Wilcorite R Resins"	lb.	.27	-	.29

RETARDERS

"E-S-E-N"	lb.	.34	-	.36
"Retardex" (tons)	lb.	——	-	.445

RUBBER SUBSTITUTES

Mineral Rubber

"38"	ton	26.00	-	32.50
"Black Diamond"	ton	26.00	-	27.50
"Byerlyte"	ton	32.50	-	45.00
Gilsonite, Selects (c.l.)	ton	30.50	-	32.90
"Hard Hydrocarbon"	ton	28.50	-	30.50
Mineral Rubber, Granulated	ton	25.00	-	27.50
Solid	ton	20.00	-	22.50
"Parmr" (drums)	ton	26.00	-	30.00
"Pioneer"	ton	32.50	-	50.00

Vulcanized Vegetable Oils (Factice)

"Amberex"	lb.	.19	-	.20½
Brown	lb.	.10	-	.19
Dispersed	lb.	.17¼	-	.30¼
"Neophax"	lb.	.15½	-	.19
White	lb.	.09	-	.18½

Miscellaneous Rubber Substitutes

"Gilsowax"	lb.	.04½	-	.05
"Insulac W"	lb.	.05½	-	.06
"Resin No. 1098" (drums)	lb.	——	-	.42
"No. 1198"	lb.	.31	-	.35
"Wilmex M-4" (and "M-6")	lb.	.05½	-	.06

SOLVENTS

Acetone (dlvd.)	lb.	.07	-	.08½
"American" Dipentene (t.c.)	gal.	——	-	.49
"Amsco" Lactol Spirits (t.c.)	gal.	——	-	.12
"Rubber Solvent" (t.c.)	gal.	——	-	.11½
"Solv A" (t.c.)	gal.	——	-	.16
"Solv B" (t.c.)	gal.	——	-	.18
"Special Napthalite" (t.c.)	gal.	——	-	.11½
"Textile Spirits" (t.c.)	gal.	——	-	.12
Amyl Chlorides, Mixed (l.c.l.) (drums)	lb.	——	-	.08
Benzol 90%	gal.	——	-	.21
Butyl Acetate (t.c.)	lb.	——	-	.198
Butyl Alcohol (t.c.)	lb.	——	-	.206
Secondary (dlvd.)	lb.	.08½	-	.10
Tertiary (dlvd.)	lb.	.11	-	.13
Carbon Bisulfide, Tech.	lb.	.05¾	-	.08
Carbon Tetrachloride	gal.	——	-	.80
Cyclohexane	lb.	.11	-	.11½
Cyclohexanone	lb.	.30	-	.30½
Diacetone, Pure (dlvd.)	lb.	.10½	-	.12
Dichlorethyl Ether (drums)	lb.	.16	-	.17
Formal (drums)	lb.	.26	-	.27
Dichloropentane (l.c.l., (drums)	lb.	——	-	.04½
"Dipentene 122" (dms.)	gal.	.56	-	.58
Ethyl Alcohol (t.c.)	gal.	.53½	-	.55½
Ethylene Dichloride (drums, dlvd.)	lb.	.07½	-	.08
Heptanes (t.c.)	gal.	——	-	.15
Hexanes (t.c.)	gal.	——	-	.15¾
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.37½	-	.47
Ether, Ref. (dlvd.)	lb.	.04½	-	.06½
Mesityl Oxide (dlvd.)	lb.	.10½	-	.12
Methanol	gal.	.36	-	.43
Methyl Acetone, Syn. (drums, dlvd.)	gal.	.46	-	.52
Methyl n-Amyl Ketone (drums)	lb.	.29	-	.30
Methyl Ethyl Ketone (dlvd.)	lb.	.08	-	.09½
Methyl Isobutyl Ketone (dlvd.)	lb.	.10½	-	.12
"N-5" Pentane Mix. (t.c.)	gal.	——	-	.06½
"N-6" Hexanes (t.c.)	gal.	——	-	.10¾
"N-7" Heptanes (t.c.)	gal.	——	-	.09½
"Nevsol"	gal.	.18½	-	.22
"Petrolene" (t.c.)	gal.	——	-	.08¾
Picolines, Alpha, Refined	lb.	.23½	-	.24½
Mixed	lb.	.24	-	.25
Pyridine, Refined	lb.	.44	-	.45
Quinoline	lb.	.24½	-	.25½
"Rubsol" (t.c.)	gal.	——	-	.07¾
"Skellysolve B" (Hexanes) (t.c.)	gal.	——	-	.10½
"C" (Heptanes) (t.c.)	gal.	——	-	.10
"E" (Octanes) (t.c.)	gal.	——	-	.129
"R" (Solvent Naphtha) (t.c.)	gal.	——	-	.081
"Solvenol"	gal.	.49	-	.58
Solvent, Crude, Light	gal.	.27	-	.30
"Sunny South" Dipentene (t.c.)	gal.	——	-	.49
"Tollac"	gal.	.18½	-	.22
Toluene (drums)	gal.	——	-	.27
Trichlorethane	lb.	.11	-	.12
Triglycol Dichloride (drums)	lb.	——	-	.49
"Tromex"	lb.	.078	-	.083
"X-7" Sp. Heptanes (t.c.)	gal.	——	-	.09
"X-8-A Solvent Naphtha"	gal.	——	-	.07½
Xylene (drums)	gal.	——	-	.27

STABILIZING AGENTS (for Vinyl Resins)

Lead Stearate	lb.	——	-	.30
"Stabilizer V-1-N"	lb.	.44	-	.50
"Vanstay"	lb.	.38	-	.50

SUN CHECKING AGENTS

"Antisol"	lb.	.23	-	.24
"Heliozone" (dlvd.)	lb.	.23	-	.24
"Sunproof"	lb.	.22¾	-	.23¾
"Jr."	lb.	.16¼	-	.17¼
"Tonox"	lb.	.50	-	.52

TACKIFIERS

"Advaresin 100"	lb.	.11	-	.11½
"Amberol ST-137X"	lb.	.32	-	.32½
"Agchem RC 30"	gal.	.65	-	1.34
"Beckopol 1400"	lb.	.24	-	.25
"Dutrex 44"	gal.	——	-	.919
"E-310 Resin Emulsion"	lb.	——	-	.14
"Galex"	lb.	.11	-	.21
"Koresin"	lb.	.40	-	.52
"Lindol Emulsion" (drums)	lb.	——	-	.27
"Liquid Rubber Flux"	lb.	——	-	.11
"Nevilloid C-55" (drums)	lb.	——	-	.12
"Pentacizer 344"	lb.	——	-	.20
"Pentalyn Resins" (dlvd.)	lb.	.14¼	-	.21
"Resin V"	lb.	——	-	.13¾
"Rubtack"	lb.	——	-	.10
"Staybelite Esters" (dlvd.)	lb.	.15	-	.23¾
"Super-Beckacite No. 1001"	lb.	.37	-	.38
"Wilcorite R-30"	lb.	——	-	.40

THICKENERS (FOR LATEX)

"Acrysol GS"	lb.	.15	-	.22
"Betanol" (drums)	lb.	——	-	.70
"Emulsorex No. 5"	lb.	——	-	.35
Propylene Laurate (drums)	lb.	——	-	.36
Sodium Silicate	lb.	.01	-	.02

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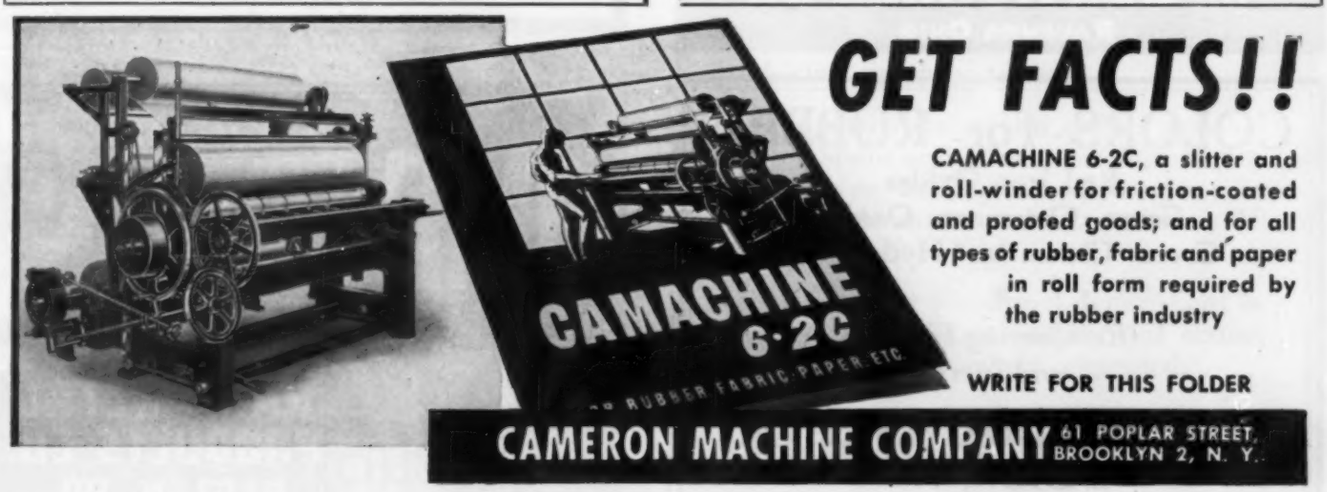

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Selenium

"Vandex"	lb.	—	1.75

Sulfur

"Crystex" (l.c.l.)	lb.	.32	.35
"Dispersed Sulfur"	lb.	—	.09
"No. 2"	lb.	.08	.12
"Devil" (c.l.)	cwt.	—	1.35
"Insoluble Sulfur 60"	lb.	—	.16
"Star" (c.l.)	cwt.	—	1.85
"Tire"	cwt.	1.35	2.05
"Tube" (c.l., dlvd.)	cwt.	—	2.40

Tellurium

"Latex Telloy"	lb.	—	1.75
"Telloy"	lb.	—	1.75

Miscellaneous Vulcanizing Agents

"VA-3"	lb.	.55	.65
"Vultac No. 1"	lb.	.38	.45
"No. 2"	lb.	.38	.45
"No. 3"	lb.	.42	.49

WASHING & FINISHING AGENTS

"Apcolene" (t.c.)	gal.	—	.08½
"Washine"	gal.	.20	.30

WETTING AGENTS

"Advawet No. 15"	lb.	—	.18
"No. 33"	lb.	—	.43
"Aerosol OT 70% Clear"	lb.	.80	1.00
"Agchem SA-15" ("16, 18")	lb.	.17	.29
"Aquarex BBX Conc." (dlvd.)	lb.	—	.70
"D" (dlvd.)	lb.	—	.60
"ME" (dlvd.)	lb.	—	.82
"NS" (dlvd.)	lb.	—	.75
"Areskap 50"	lb.	.18	.24
"Dry 100"	lb.	.39	.51
"Aresket 240"	lb.	.16	.22
"Dry 300"	lb.	.42	.50
"Aresklene 375"	lb.	.35	.50
"Dry 400"	lb.	.51	.65
Lecithin	lb.	—	.26
"Santomerse D"	lb.	.41	.65
"S"	lb.	.11	.25
"Stablex G"	lb.	—	.70
"Triton K-60"	lb.	.29	.36
"N-100"	lb.	1.00	1.07
"720"	lb.	.26	.33
"770"	lb.	.14¾	.22
"Yelkin C"	lb.	—	.55

MISCELLANEOUS CHEMICALS

"Acto 450" ("550-W," "600," "630")	lb.	.09¾	.11⅜
"Agchem SA-17"	lb.	—	.29
"Aquarex SMO" (dlvd.)	lb.	—	.40
"A.S.T.M. Oil No. 1" (and "No. 3")	gal.	1.00	1.15
"Black-Out"	gal.	4.50	8.00
"Black Shield 4701"	lb.	—	.21
2-Ethylhexanol (dms., dlvd.)	lb.	.25	.26
Glycerine, 88% Sap., Crude (dlvd.)	lb.	.14	.14½
"Hydrozo"	lb.	—	.51
"MODX" (tons)	lb.	—	.29½
"Para Resin No. 1784"	lb.	—	.09¾
"No. 2457"	lb.	—	.04
"No. 2718"	lb.	—	.04
"Resin No. 1226"	lb.	.31½	.36½
Resorcinol (dlvd.)	lb.	—	.64
"Rio Resin"	lb.	.36	.38
"Santocel"	lb.	—	.50
"Sublac"	lb.	.25	.27
"Synpep N" (drums)	lb.	—	.54
"Tysonite"	lb.	.16½	.17¾
"Vinsol Resin"—Lumps	lb.	—	.04
Pulverized	lb.	—	.04

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RUBBER CHEMIST: B.S., Ch.E., 1944; age 25. Two years' experience in the development and factory processing of natural and synthetic rubber. Expereince: supervision, development, compounding, adhesives, plasticizers, calendering, mill mixing, banbury mixing. Desires position with progressive organization. Metropolitan New York area preferred. Address Box 2340, RUBBER AGE.

RUBBER CHEMIST, age 34, 13 years' diversified experience covering laboratory, product development, factory processing, and finished goods production on mechanicals, sundries, tires, and some plastics. Qualified for responsible development position in progressive organization. Address Box 2351, RUBBER AGE.

CHEMICAL ENGINEER, young, 3½ years' extensive experience in product development of water emulsions and solvent solutions of synthetic, natural, reclaim rubbers, vinyl polymers used for adhesives, coatings, saturants; good sales servicing experience; position within commuting disance of New York City. Address Box 2354, RUBBER AGE.

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MANAGER, with 20 years' experience handling sales and production from compounding to finished product of molded and extruded goods, with plant layout and special designed equipment experience to reduce costs. Address Box 2360, RUBBER AGE.

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PRODUCTION SUPERVISOR, experienced in hard rubber compounding and molding. Must have training or experience in plant engineering and administration. Plant located on West Coast. Position offers right individual an excellent opportunity. Address Box 2325, RUBBER AGE.

CHEMIST ASSISTANT with some experience in rubber and synthetic rubber. Plant in New Hampshire. Address Box 2326, RUBBER AGE.

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RUBBER ADHESIVE CHEMIST with extensive practical experience in the development and production of natural and synthetic rubber adhesives and related products. This permanent position offers an excellent opportunity with a long-established firm in the Greater New York area. State education, experience, availability, salary requirements, etc., in first reply. Applications will be held in strictest confidence. Address Box 2342, RUBBER AGE.

GRADUATE CHEMIST OR CHEMICAL ENGINEER for work as assistant chemist in rubber plant located in Connecticut. State in detail in first handwritten letter: age, education, experience if any, and remuneration expected. Address Box 2363, RUBBER AGE.

HELP WANTED (Continued)

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BAKELITE CORPORATION
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LEADING EASTERN RUBBER MANUFACTURER needs young engineer knowing mechanical rubber goods compounding and manufacturing techniques. Excellent opportunity for right man. In reply state age, education, and business experience. Address Box 2347, RUBBER AGE.

EXCELLENT OPPORTUNITY FOR CHEMICAL ENGINEER-CHEMIST who has specialized experience in the development and production of rubber cements and sealers. Middle West location. Give particulars of background, availability, and salary expectation in first letter. Address Box 2353, RUBBER AGE.

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Internationally known mid-west manufacturer needs competent Rubber Compound Supervisor. The man selected preferably will have a chemical engineering background. He will be experienced in all phases of rubber processing, particularly compounding, banbury and open-mill mixing, calendering, extrusion, and molding. If you can qualify for a permanent position of this type, send abstract of education and experience, photograph, and state salary expected. Replies are confidential. Address Box No. 2352, The Rubber Age.

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WANTED: Rubber Mill, 36 to 60 inches. First class condition only. Write complete details and price. Address Box 2303, RUBBER AGE.

WANTED: 3A Banbury in good condition for immediate delivery. Address Box 2341, RUBBER AGE.

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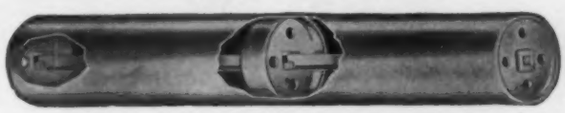

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